Draft Environmental Impact Statement for the Ely Energy Center
Volume 1

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U.S. Department of the Interior
Bureau of Land Management
Ely District Office
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BLM

Draft Environmental Impacts Statement for the Ely Energy Center Project

(X) Draft **() Final**

Lead Agency:	U.S. Department of the Interior Bureau of Land Management Ely District Office
Cooperating Agencies:	Region 9 Environmental Protection Agency National Park Service White Pine County, Nevada
Counties Directly Affected:	Clark, Elko, Lincoln, Nye, and White Pine, Nevada
Date EIS Filed with EPA:	JAN 02 2009
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Comments must be received by:	APR 03 2009

ABSTRACT

In compliance with the National Environmental Policy Act, this Draft Environmental Impact Statement (EIS) evaluates the environmental effects of the construction, operation, and maintenance of the Ely Energy Center proposed by Nevada Power and Sierra Pacific Power in White Pine County, Nevada, on lands currently managed by the Ely District Office of the U.S. Bureau of Land Management (BLM). Electric transmission and railroad facilities related to the project are also located in Clark, Elko, Nye, and Lincoln Counties, Nevada. The Proposed Action and North Plant Site Alternative include construction of a 1,500 MW coal-fired power plant in Steptoe Valley north of Ely, two 500 kV electric transmission lines from the power plant extending 250 miles south to the Harry Allen substation near Las Vegas, development of a well field and facilities to provide 8,000 acre-feet per year of water for use in the power plant, transportation of 9,425,000 tons per year of coal on a refurbished, existing railroad or a new rail line alternative, associated local infrastructure changes, and use of best management practices and mitigation measures to avoid environmental impacts or minimize the magnitude, extent, and duration of impacts. Associated Federal actions include BLM's issuance of Rights-of-Way for construction and operation of the project and the sale of land for the power plant site to the Proponents.

Authorized Officer Responsible for the Environmental Impact Statement:

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Ely District Office

Executive Summary

Ely Energy Center

Draft EIS

EXECUTIVE SUMMARY

The following sections summarize the Draft Environmental Impact Statement (DEIS) for the Ely Energy Center (EEC) Project. This information is provided as a convenient synopsis for the public, but is not a substitute for review of the complete DEIS. This summary provides a general overview of the proposed project and its purpose and need; briefly describes the Proposed Action and other alternatives; summarizes major impacts for key resources associated with the Proposed Action and the North Plant Site Alternative; and lists key consultation and coordination activities.

This Environmental Impact Statement (EIS) was prepared in response to an SF 299 *Application for Transportation and Utility Systems and Facilities on Federal Lands* for the Ely Energy Center (EEC) and Electric Transmission Support, submitted by Nevada Power Company (NPC), in conjunction with Sierra Pacific Power Company (SPPC). Together, these companies are referred to in this document as the Proponents. The purposes of the EIS are for the U.S. Bureau of Land Management (BLM) to evaluate and disclose potential impacts of the proposed development of the EEC power generation plant and associated facilities, and determine whether to grant rights-of-way and convey lands through direct sale.

Cooperating agencies for this EIS include the National Park Service, the Environmental Protection Agency, and White Pine County. The Confederated Bands of Goshute Tribe were invited to participate as a cooperating agency; however they have not signed the MOU to make it official. The Nevada Department of Wildlife and U.S. Fish and Wildlife Service were initially cooperating agencies but later withdrew because of other commitments.

The Notice of Intent (NOI) for the EEC EIS was published in the Federal Register on January 26, 2007. A legal notice was published in the High Desert Advocate, the Ely Times, the Las Vegas Review Journal, the Reno Gazette Journal, and the Valley Voice newspapers. In addition, a scoping letter was prepared and sent to a list of approximately 1,800 potentially interested individuals, agencies, and organizations. Five scoping meetings were held between February 5 to 9, 2007 in Las Vegas, Alamo, Ely, Elko, and Reno, Nevada. The 30-day scoping period, during which comments were received, was from January 26 through February 26, 2007. A total of 9,374 letters, emails, and faxes were received in response to the request for public comment regarding the Proposed Action, of which 377 were unique responses.

Proposed Action

The Proponents propose to construct and operate a coal-fueled electric generating facility about 20 miles north of Ely, in White Pine County, Nevada, referred to as the EEC. The power generation site would be developed in two phases.

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Proposed Action

The Proponents propose to construct and operate a coal-fueled electric generating facility about 20 miles north of Ely, in White Pine County, Nevada, referred to as the EEC. The power generation site would be developed in two phases.

Phase 1 of the EEC would include:

- Two coal-fueled 750-MW ultra-supercritical[1] steam turbine units and associated site facilities.
- Plant water supply, including water wells, surge tanks, pipelines, pipeline access road and pumping stations to the EEC, and a raw water storage pond on the plant site.
- Communications systems and a 69-kV power line to provide electrical service for the water supply pump stations, construction workforce temporary housing, and construction power to the EEC.
- Rail line and associated facilities and infrastructure for connection from the power plant to the existing Union Pacific RR at Shafter in Elko County. This would consist of a rail lead connection to the reconstructed NNRy, if available, or construction of an alternate new rail line from the power plant to Shafter.
- Permanent and temporary access roads from the public road system to the facilities.
- A water well at the plant site to provide construction water for the EEC.
- Temporary housing ("worker village") for the construction workforce (on private property).
- Access roads into and along all of the linear facilities.

The electrical transmission facilities associated with Phase 1 would include:

- A new 500-kV switchyard at the EEC.
- A new 500/345-kV substation near Robinson Summit and two 500-kV transmission and fiber optic lines from the EEC to Robinson Summit Substation;
- A loop-in of the existing SPPC Falcon – Gonder 345-kV transmission line.
- A 500-kV transmission and a fiber optic line from Robinson Summit Substation to Harry Allen Substation.
- An expansion of the 500-kV Harry Allen Substation.
- Access roads into and along all transmission lines.

Phase 2 of the EEC would include:

- Two coal gasification 500-MW units and associated site facilities at the same plant site as Phase 1.
- Additional water supplies as required.
- A 500-kV transmission and fiber optic line from Robinson Summit to the Harry Allen Substation, generally parallel to the Phase 1 transmission line.

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[1] "Ultra-supercritical" is a reference to the physics of generating steam at higher pressure and temperature; beyond these points, steam is no longer a mixture of steam and water requiring separation in a traditional drum design, and is physically a single fluid that passes through a boiler to drive a steam turbine generator. This new technology reduces fuel consumption and emissions by 5 to 10 percent over conventional "sub-critical" technologies, providing previously unrealized efficiency and operating cost benefits.

It is planned that the Phase 2 units would utilize coal gasification technology, such as integrated gasification combined cycle (IGCC), or another clean combustion technology option. IGCC or similar technology of sufficient scale and commercial reliability has not yet been developed to the point where designs can be rendered and analysis can be realistically prepared for all environmental impacts. Therefore, this EIS will only analyze the impacts of the components of Phase 2 that can realistically be evaluated at this time (i.e., the ground disturbances related to the entire power plant site and two 500-kV transmission lines, one for each phase). When definitive plans for Phase 2 of the EEC project are identified, a new air permit and required NEPA analysis would be prepared to evaluate the environmental impacts of that phase before its approval.

The total land area needed for the generating facility would be approximately 3,000 acres (comprised of an approximately 2,500-acre tract disposed through direct sale by BLM and an additional 500-acre ROW), which includes approximately 1,000 acres for the landfill for ash and other combustion by-products.

Supporting infrastructure would include transmission lines, substations, water supply facilities, and rail line facilities (**Figure 2.2-1**). The majority of the transmission lines would be within the Southwest Intertie Project (SWIP) Corridor.

Water delivered to the power plant would be used primarily for steam generation, air emissions control, and cooling purposes. Additional water uses would include in-plant potable water, plant maintenance and wash down, plant fire protection, and other miscellaneous requirements. Power generation equipment for Phase 1 of the EEC project, including all ancillary uses, would require a total annual water consumption of 8,000 acre-feet per year.

The Proposed Action components of the water facilities include:

- Lages Station Well Field
- Lages Station Water Line

The rail facilities would include a rail lead connecting to the Nevada Northern Railway (NNRy), which is currently proposed to be upgraded (Corps 2008). The rail line would be utilized for deliveries of coal, other bulk materials, and equipment to the power plant.

The power plant would be operated 24 hours a day, 365 days per year. The power plant is anticipated to have a commercial life of approximately 50 years.

Alternatives

Two siting studies were conducted to identify appropriate sites for the proposed power plant. In 2003, Lockwood Greene generally identified sites within the southwest United States that could support southern Nevada power needs, but gradually narrowed the focus to White Pine County, Nevada as the preferred location for new coal-fueled power development. In 2006, Burns and McDonnell developed a Constraint Study to identify the critical issues associated with each site that would affect the development and construction of a new baseload generating facility. Three sites were evaluated (two in Steptoe Valley and one in Butte Valley) for: access to available infrastructure; proximity to the community services offered by Ely/McGill; distance from air quality sensitive areas; adequate topography and acreage; and considerations of the potential for both noise and visual impacts. The South Plant Site was selected as the Proposed Action and the North Plant Site was selected as the Action Alternative. Other recommended alternatives considered but eliminated from more detailed analysis are described in **Section 2.5** of this DEIS.

The North Plant Site is located about 50 miles north of the town of Ely. The plant site itself would be similar to the Proposed Action in most respects, except for a few minor changes to the site layout (**Figure 2.3-3**). The plant site would still be approximately 3,000 acres total, comprised of a 500-acre ROW and 2,500 acres to be purchased from the BLM. The associated supporting infrastructure and facilities would be similar to the Proposed Action.

If the NNRy is not upgraded, the Alternative Rail Line would roughly parallel the NNRy ROW from the Union Pacific Railroad (UPRR) at Shafter and connect directly to either of the plant sites.

Several electric transmission line alternatives were considered including:

- EEC 500/345 kV Substation Alternative
- 500 kV Transmission Lines from EEC Substation to Harry Allen Substation
- SWIP Corridor Alternatives

Besides the Proposed Action, six water supply facility alternatives are also analyzed. All water supply alternatives are located within the northern Steptoe Valley basin. Water supply alternatives include the following:

- Reduced Lages Station with Coyote Valley Ranch Well Field (Alternative)
- Reduced Lages Station with Limited South Well Field (Alternative)
- North Well Field (Alternative for North Plant Site Alternative only)
- Middle Well Field (Alternative)
- South Well Field (Alternative for South Plant Site only)
- Duck Creek Surface Water Impoundment (Alternative)

BLM Actions

BLM actions for this project would include issuance of ROWs necessary for construction and operation of the power plant and associated linear facilities and subsequent sale of the power plant site. ROWs issued for 30 years with options to renew, would be necessary for the operation and maintenance of all EEC facilities located on BLM-administered public land. In addition, short-term ROWs would be required from the BLM to accommodate construction activities such as drilling, trenching, paving, and material/equipment staging.

The Proponents have requested that the BLM sell to them the approximately 2,500 acres identified for the combustion byproducts landfill and other plant infrastructure for the power plant. The remaining 500 acres would remain under BLM ROW Grant authorization. Under BLM regulations and guidance, federal land identified for disposal in the applicable BLM Resource Management Plan (RMP) may be sold by competitive bid, modified competitive bid, or direct sale.

ENVIRONMENTAL IMPACTS

Proposed Action and Alternatives

In **Chapter 4** of the DEIS the environmental effects of the various components of the Proposed Action were evaluated and compared to the alternatives, which are detailed in **Chapter 2**. The primary environmental impacts for the components of the Proposed Action and Alternatives, including No Action, are outlined in **Tables 2.6-2** through **2.6-3a-d**. The environmental impacts of these alternatives and components are summarized in the following narrative.

Water Resources

Surface Water Conditions

The principal drainage in the project area is Duck Creek. The Duck Creek watershed originates in the Schell Creek Range and runs west into Steptoe Valley through Gallagher Gap, north through Bassett Lake, then north toward Goshute Lake--an ephemeral water body located at the northern end of Steptoe Valley.

Bassett Lake, a man-made impoundment, is located southwest of the proposed South Plant Site. It is fed from a combination of sources, including surface water flow from Duck Creek, discharge from McGill Spring, Heusser Spring, and Steptoe Slough. During the summer months, water diverted from Duck Creek by Kennecott Copper Company is used to irrigate the tailings area west of McGill.

Downstream of Bassett Lake a number of springs and wet meadow areas west of the Duck Creek channel, known as the Campbell Embayment, provide gaining flows to the Duck Creek system. From there north, Duck Creek broadens into a number of braided channels, rapidly losing flow to infiltration and evapotranspiration in a flat section of the valley floor until it becomes ephemeral.

Goshute Lake, a dry lakebed, is located near the northern end of Steptoe Valley. It is the geographic terminal sink for the Duck Creek drainage system; however, flow from Duck Creek typically fails to reach the lake due to infiltration. A number of local springs and ephemeral creeks also discharge west of Goshute Lake although their flows are rapidly lost to infiltration and evapotranspiration.

Wetlands are present in and adjacent to Duck Creek as it runs north through the project area. These wetlands range from emergent wetlands to wet meadow/alkali meadow habitats found adjacent to Duck Creek.

Groundwater Conditions

An alluvial valley fill aquifer underlies the Steptoe Valley. Information on the stratigraphy of Steptoe Valley from existing well logs and previous studies suggests that the valley fill aquifer has variable hydraulic properties in the vertical and horizontal dimensions; however, there is little data on the deeper stratigraphy of the valley due to the lack of deeper wells with detailed well logs (Mayo 2007a).

Construction

The most likely impacts to surface water from the project would be from surface disturbance during construction. As described in **Section 2.2.1.1**, the project is being designed as a "zero-discharge" facility, where industrial wastewater and contact storm water would be captured

onsite and stored in lined evaporation basins, while offsite runoff would be routed around the facility via a series of perimeter dikes and diversions. The evaporation ponds and diversions would be developed at the onset of construction to meet the zero-discharge requirements.

BMPs would be implemented at all locations to avoid and/or minimize surface water quality impacts during the construction phase. Short-term, minor effects may include the degradation of seasonal surface runoff through altered hydrology, vegetation removal, or soil compaction.

Under the Proposed Action, wetlands within the project area would not be directly or indirectly impacted. Wetlands are not present within the footprint of the power plant facility, or within the railroad extension and water supply pipeline areas. Wetland areas associated with Duck Creek and the White River would be spanned by transmission lines, and no pole structures would be placed within these wetlands.

Operations

In addition to the area of direct effects due to surface disturbances, resources potentially affected by project water supply requirements were determined by evaluating modeled groundwater drawdown zones for the well field alternatives.

According to groundwater modeling conducted by EMS-I (2007) the maximum drawdown in the proposed Lages Station Well Field was predicted to be 15.3 feet. An area with one or more feet of drawdown extended to about 7 miles to the southwest of the Lages Station Well Field and about 8 miles to the northwest of the well field. The north-south extent of the 1-foot or greater drawdown along the west boundary of the model was about 12 miles. Drawdown greater than about 3 feet was localized to the general area of the well field and the area northeast of the well field (**Figure 4.2-1**).

A spring complex is located west of Goshute Lake and Lages Station on the alluvial fan fronting the east side of the Cherry Creek Range. These springs and their associated wetlands are supplied by water from the alluvial fans to their west and not from the valley fill aquifer. Therefore, they would not be affected by the proposed pumping regime in the valley fill aquifer. Since these springs would not see reduced flows, impacts to such sensitive species as the Northern Steptoe springsnail (*Pyrgulopsis serrata*) and other species of springsnails present in Steptoe Valley would not occur as a result of the groundwater pumping.

The Proposed Action drawdown contours show less than 2 feet of drawdown beneath the northern, ephemeral reach of Duck Creek and Goshute Lake. The April 2007 water table map shows the depth to water under Goshute Lake as 50 feet or less below ground surface (bgs), and digital files associated with the groundwater model indicated that the water table is typically 10 feet or more bgs along the Duck Creek channel (EMS-I 2007). These data suggest that the small predicted drawdowns associated with the Proposed Action would not result in reduced flow in Duck Creek, nor would they affect occasional periods of temporary inundation in Goshute Lake during unusually high surface runoff conditions.

Seven individual groundwater rights are located within the Lages Station Well Field drawdown contours that are greater than 5 feet. For the Proposed Action, a total of eight active water rights are present within drawdown contours, with the majority falling between 5 and 10 feet of predicted drawdown.

The area of drawdown would shift south with the other well field alternatives that are located south of Lages Station. For the southernmost well field alternatives, the drawdown area of 1 to 2 feet would extend under the perennial reach of Duck Creek, Steptoe Slough and Bassett Lake. Bassett Lake is largely supported by balancing surface inflows to the reservoir with

discharge from the reservoir, which would tend to mitigate the effects of a 1 to 2-foot lowering of the local water table. Indirect effects as a result of groundwater pumping would not occur, as wetlands associated with springs in Steptoe Valley are not supported by the regional valley-fill aquifer from which water supply for the facility would occur.

Geology and Minerals

The EEC project could locally alter surface topography. Authorized mining claims, oil and gas leases, and geothermal leases occur near the vicinity of project elements. The anticipated level of impacts to geology and minerals would be negligible for construction of the proposed plant site and minor and long-term for construction of the power lines and water lines.

Paleontological Resources

Paleontological resources are present in the general area of the Proposed Action and Alternatives. Sediments with varying potentials (or sensitivities) to contain paleontological resources have been identified in the project area. Adherence to the mitigation measures described in **Section 4.4.2.5** would result in minor impacts to paleontological resources. If significant fossils were found during construction, they would be mitigated under direction of the BLM or other appropriate agency paleontological resource specialist. Disturbance of areas with high potential for containing paleontological resources would be avoided to the extent possible as addressed in a COM Plan that would be developed and reviewed by the BLM prior to construction.

Mitigation measures would be implemented within the project area in sediments determined through pre-construction surveys as being likely to contain significant paleontological resources (i.e., high paleontological sensitivity). Compliance with the mitigation measures would ensure that excavation impacts to paleontological resources would be minor.

Soils

It is anticipated that all of the required borrow materials for general grading would be obtained from the plant site and areas associated with other disturbance. Minor physical and chemical changes to the soil are expected to occur due to mixing during initial salvage operations and when placed in stockpiles for future reclamation use. Physical impacts to soil resources during construction and reclamation would include compaction and crushing of the soil and soil crust by equipment during salvage and stockpiling. Physical effects of soil compaction would be short-term, minor to moderate, and include reduced permeability and porosity, damage to microbiotic crusts, increased bulk density, decreased available water holding capacity, increased erosion potential, reduced gaseous exchange, and loss of soil structure. Soils in the area of the Proposed Action or Action Alternatives characteristically have a high percentage of coarse fragments, which would provide support for heavy equipment without compressing the underlying soils.

A portion of the soils within the area of the Proposed Action and Alternatives would be physically lost during salvage and replacement operations through mechanical and erosion effects. Soil mixing and loss of some soil would also occur during final growth medium distribution and completion of reclamation.

Potential impacts to soil resources would be similar for the Proposed Action and Alternatives. Reclamation of the temporarily disturbed areas would return these soils to productivity by being

utilized as growth medium in reseeded areas, while unreclaimed areas would be permanently eliminated from potential production.

Air Quality

The Action Alternatives propose to build and operate the same 1,500 MW generation station at either of two different locations approximately 28 miles apart in the Steptoe Valley. Though there would be slight differences in layout based upon the shapes of the similar sized parcels, the ambient air impacts of the two action alternatives during construction and operation would be similar in magnitude.

The power plant operations are estimated to emit: 1,788 tons/year (TPY) of particulates, 4,628 TPY of sulfur dioxide, 7,720 TPY of carbon monoxide, and 4,853 TPY of nitrogen oxides. The Proponents have submitted a permit application to the State that shows emission controls would meet Best Available Control Technology requirements and controlled emissions would comply with ambient air quality impact limits for criteria air pollutants. Air quality impact modeling has shown that plant site operations would not exceed federal and state limits for incremental air quality degradation, and that facility impacts combined with measured background concentrations would not approach national or Nevada ambient air quality standards.

An estimated 285 TPY of volatile organic compounds would be emitted as well as various amounts of regulated hazardous air pollutants listed in the EIS including: 2 TPY of lead and 0.15 TPY of mercury. The Proponents would use Maximum Available Control Technology to reduce these emissions. Activated carbon injection would be used for mercury control.

Emissions from construction of the facilities, employees commuting to the operations, and the transportation of major supplies, including coal, via the proposed rail connection have also been included in the EIS impact analysis.

Greenhouse gas emissions from the operations would include carbon dioxide, methane, and nitrous oxide totaling the equivalent of 10.6 million TPY of carbon dioxide.

Quantitative estimates were prepared to estimate visibility impacts (extinction) for the two Class I areas and the two identified sensitive Class II areas selected by the federal land managers. Visibility extinction modeling results indicate an increase of 2.7 percent at Zion National Park and 7.4 percent in the Jarbidge Wilderness Area.

Another analysis was performed to assess the extent to which fog formation associated with plant site operations would cut down visibility especially along Highway 93 (US-93). Model results indicate that the combination of atmospheric conditions in the area and the plant operations would not produce any increase in fog or icing along US-93.

Quantitative estimates of deposition of nitrates and sulfates were performed for the Class I areas and sensitive Class II areas selected by the federal land managers. The results of the analysis show long-term, minor impacts at Zion National Park and minor to moderate impacts at the Jarbidge Wilderness Area. The BLM recommends a threshold of 3 kilograms per hectare per year total deposition of nitrogen and 5 kilograms per hectare per year total deposition of sulfur, including background as well as predicted impacts of proposed future actions. Comparisons of predicted deposition levels with each of these thresholds show that deposition rates are predicted to be within the recommended cumulative range across all Class I and Class II areas analyzed.

The impact of the deposition of numerous chemicals contained in small concentrations in the plant exhaust was assessed through the application of a risk assessment model, which included assessment of human and ecological risk from inhalation and all other exposure pathways.

Total human health risks were under the excess cancer threshold of 1 in 100,000 for all receptors studied. Excess cancer risks associated with emissions from the plant were predicted to be less than 1 in 1 million. The maximum modeled concentrations for arsenic, lead, and mercury, in the soil, water and air of the modeled area were significantly less than EPA-recommended thresholds.

Terrestrial ecological receptors evaluated as communities included plants and soil invertebrates, while aquatic receptors evaluated as communities included benthic invertebrates and aquatic life. Four terrestrial habitats and two aquatic habitats were evaluated.

The magnitude of ecological risk was characterized and the modeled endpoints indicate that EEC operations would not adversely affect terrestrial and aquatic receptors and communities.

Vegetation

Vegetation

Both permanent and temporary vegetation impacts would occur as a result of building the Proposed Action and Alternatives. Impacts would occur during construction where project elements would be built, resulting in vegetation loss. These impacts would be long-term where permanent facilities are built. Temporary impacts to vegetation would occur at construction-related disturbances that would then be reclaimed after construction. **Tables 4.7-1** and **4.7-2** show the approximate acres of temporary and permanent impacts of the Proposed Action and the Alternatives by vegetative community.

Noxious and Non-native, Invasive Weeds

Noxious and non-native invasive weeds were observed throughout the area of analysis with the majority of occurrences in central Steptoe Valley on, or adjacent to, roads and fence lines. A total of 16 noxious and non-native, invasive weed species were identified through existing data and field observations (**Table 3.7-7**). The spread of these species through new disturbance areas related to construction of the Proposed Action and Alternatives may be an issue. An Integrated Weed Management Plan approved by the BLM Weeds Coordinator for the project would address the control of noxious weed communities in the project area. The Segment 3 alternative transmission line and Duck Creek Impoundment water supply alternative present the greatest risk for noxious weed impacts.

Special Status Plant Species

No federal or state listed or proposed species or BLM sensitive species were found in the project area from Steptoe Valley south to the Robinson Summit Substation area. Hanging bladderpod, a species that has no federal or state status but is considered at-risk by the NNHP, was found along an unnamed ephemeral channel at the Robinson Summit Substation site. Areas of the SWIP Corridor contain sensitive species including: White River catseye (*Cryptantha welshii*), and Tiehm's blazing star (*Mentzelia tiemhii*). JBR (2008a) provides maps of observed special status plants for the project area. No special status plant species occur within the South Plant Site, associated worker village, the Mt. Wheeler Transmission line, the water supply facilities areas, or the rail line ROWs; therefore, no impacts are anticipated. Special status plant species have the potential to occur in selected locations within the electric transmission line ROWs, particularly in Lincoln and Clark County. As would be developed and

presented in the COM Plan, pre-construction surveys and pole structure placement would allow for avoidance and/or relocation of significant special status plant communities, thereby rendering impacts to negligible.

Wildlife

Big game species within the area of the Proposed Action and Alternatives consist primarily of pronghorn antelope (*Antilocapra americana)*, mule deer (*Odocoileus hemionus*), Rocky Mountain elk (*Cervus canadensis nelsoni*), and two subspecies of bighorn sheep *(Ovis canadensis nelsoni and Ovis canadensis canadensis)*. The following categories of wildlife are abundant, widespread, and inhabit or forage within the majority of the project area: bats, small mammals, predatory mammals, reptiles, migratory birds, and upland game birds.

Sensitive species are known to occur within the three BLM Districts that encompass the project area. The higher profile species include the Bald eagle (*Haliaeetus leucocephalus*), Sage grouse (*Centrocercus urophasianus*), pygmy rabbit (*Brachylagus idahoensis*), western burrowing owl *(Athene cunicularia hypugaea)*, and banded gila monster (*Heloderma suspectum cinctum*).

The project area is home to many types of raptors including hawks, owls, eagles, accipiters, and falcons. The habitat types in the project area provide numerous nesting, perching, and foraging opportunities for a variety of raptor species from early spring (February/March) to late summer (August). Surveys for raptor nests in high potential habitats occurring within portions of the project area were conducted for this project. Twelve species of raptors were observed during baseline surveys. **Figures 3.8-3a and 3.8-3b** show the location of previously recorded and newly identified known raptor areas and nest locations within 2 miles of the project area.

Sagebrush vegetation communities, comprising nearly 25 percent of the project area, have been identified as Priority A habitat under the *Coordinated Implementation Plan for Bird Conservation in Nevada*. Priority A habitat is defined as habitat being under high threat, having high opportunity, and high value to birds statewide (Nevada Steering Committee Intermountain Joint Venture 2005).

Wildlife observed within the project area is listed in **Appendix 3B**.

The Proposed Action and Action Alternatives would permanently impact wildlife habitat at the power plant site and within portions of the long-term ROWs for the electric transmission facilities, water supply facilities, and rail facilities. These impacts to wildlife would likely be long-term but minor, as the vegetative communities/wildlife habitat present within each of the project elements are common and widespread throughout the area. Indirect impacts would result from the displacement of species utilizing these areas into adjacent undisturbed areas. Some, small and less mobile wildlife species would be killed or injured during construction activities.

<u>Threatened, Endangered, Proposed, and Candidate Species</u>

The USFWS identified four threatened, endangered, proposed, and candidate (TEPC) species that are known or expected to occur within the area of the Proposed Action and Alternatives (USFWS 2007a). These species include Desert Tortoise (*Gopherus agassizii* - Mojave Population), Yuma Clapper Rail (*Rallus longirostris yumanensis)*, Southwestern Willow Flycatcher (*Epidonax traillii extimus*), and Western yellow-billed cuckoo (*Coccyzus americanus)*. Impacts to only the desert tortoise are anticipated as Transmission Line Segments 9, 10, and 11 would occur within desert tortoise critical habitat. Potential for direct impacts to the desert

tortoise are expected to be either avoided or greatly minimized through the implementation of BMPs and applicable mitigation measures.

Range

The Proposed Action and Alternatives would be constructed on a landscape dominated by arid rangelands. Most of these lands are managed by the BLM and are divided into grazing allotments used principally for cattle grazing, some sheep grazing, and wildlife habitat. There are 51 allotments within the project area. The project area also includes 10 horse management areas (HMAs). Water is another variable resource; some allotments and HMAs have several springs and/or developed water sources while others may have only one water source. Cattle and horses move up to several miles a day to reach good forage and good water, and will often congregate around water sources or on high, breezy ground (Griffith 1999). Grazing land that is permanently occupied by project facilities would be removed from grazing use for the long term. Temporary construction disturbances would be restricted from grazing during construction but would be restored to grazing use through reclamation activities after construction. The level of project impacts to any one allotment or HMA depends upon the surface disturbance within each allotment or HMA. The largest impacts would occur to the Duck Creek Flat and Steptoe allotments.

Cultural Resources

There would be direct impacts to NRHP-eligible cultural resource sites under the Proposed Action and Alternatives. The Proposed Action would likely impact 18 known sites and a projected 454 additional acres of NRHP-eligible cultural resource sites. The North Plant Alternative would likely impact 24 known sites and a projected 456 additional acres of NRHP-eligible sites. Impacts to eligible cultural resources, especially along electric transmission lines and water facilities associated with the plant sites, would be avoided where possible or lessened through project design and mitigated through data recovery studies. Impacts to cultural resources would be moderate, and long-term.

There would be no indirect visual impacts to NRHP-eligible historic resources in the area (**Table 3.10-2**); however, construction at either plant site would adversely affect the recommended NRHP-eligible Steptoe Valley Historic Landscape. This would be mitigated through recordation and documentation of the Steptoe Valley Historic Landscape to Historic American Landscape Survey (HALS) standards.

Certain aspects of the Project remain conceptual or in preliminary design pending completion of the EIS and project design finalization. As outlined in the Programmatic Agreement, all elements of the final design would be fully inventoried and Section 106 satisfied prior to any project related disturbance.

Native American Concerns

Native American Concerns, including potential impacts to places of cultural or geographic interest to the Tribes, would be expected to be negligible because any adverse impacts to these resources would be addressed through consultation. No specific concerns have been raised to date by the various Tribes regarding any religious site, sacred site, or traditional cultural property.

Land Use and Realty

Construction of either power plant site would constitute a change of land use from multiple use to industrial, and would shift ownership of up to 2,500 acres from public to private. Construction of the electric transmission lines would largely occur within the SWIP Corridor already designated for this land use. Other project related features such as transmission lines outside of the SWIP, the water pipelines, and new rail lines and leads would be built within new ROWs issued by the BLM. These changes would be in keeping with the applicable BLM Resource Management Plan and local land use plans.

Special Designation Areas

Eighteen special designation areas (SDAs) are within 50 miles of the Proposed Action and Alternatives. A small number of these areas may experience minor impacts from noise, air emissions (e.g. clarity from dust and smoke emissions) and viewshed intrusions during construction or operation of project components, including transmission lines.

Transmission lines, rail lines and water supply facilities run through or are adjacent to a number of SDAs. Noise and dust may create minor and short-term impacts during construction for SDAs in or near the direct effects areas.

Recreation

Dispersed recreation on public lands dominates recreation in the Steptoe Valley and adjacent rural areas. The 2004 Nevada State Comprehensive Outdoor Recreation Plan (SCORP) identified the desire to protect, maintain, and increase public access to public lands as the top recreation management priority for the State of Nevada. Impacts to this type of recreation would come from sale of public lands for the plant site and increased use due to increased population related to the project. Neither the Proposed Action nor Alternatives would conflict with existing BLM Resource Area RMPs across the project area. Management objectives related to recreation would remain viable and implementable. Construction of the water pipelines, transmission lines, and/or rail line would temporarily impact the integrity of a high-potential segment of the Pony Express National Trail (PET) and would temporarily limit public access. None of the other proposed project elements would significantly affect public access to public lands.

There are very few developed recreation facilities in the project area. Proposed electric transmission facilities would cross or approach a number of designated recreation areas, including the Kirch Wildlife Management Area, Pahranagat National Wildlife Refuge, and Desert National Wildlife Refuge. Construction activities may temporarily limit access and use of these areas due to noise, dust and equipment; wildlife may be temporarily displaced and vegetation may be removed. Construction of water supply facilities may temporarily limit access to the PET, and the Mt. Wheeler Transmission Line, which would be in the PET ROW, would have a visual impact on trail users.

Visual

Most of the components of the Proposed Action and North Plant Site Alternative would meet management objectives for visual resources when viewed from the KOPs. Both plant sites are adjacent to US-93 and would be viewed by large numbers of vehicles on a daily basis. Proposed design criteria built in as part of the Proposed Action and North Plant Site Alternative would help reduce the visual impact, but the plants would still dominate the view from vehicles

on the highway. However, due to the high speeds (up to 70 mph) vehicles travel on the highway, the plants would dominate the view for a relatively short time when traveling either north or south in Steptoe Valley.

Transmission Line Segments 6C and 10 (alternative), which cross VRM Class II land, would not meet management objectives for viewers in those locations.

Noise

Noise impacts to the nearest residential locations during construction and operation of the power plant would be temporary and minor except during the brief and intermittent steam blows, to test power plant piping when moderate impacts would be observed during daytime hours. Additional, minor noise impacts would be felt through Steptoe Valley due to increased population, vehicle traffic, rail traffic and general economic activity during construction and operations.

Socioeconomics

Social and economic impacts arising from the Proposed Action and Alternatives can be divided into two phases. The initial phase would result from construction of the project and would be temporary. The second phase would result from additional permanent employment in the three closest counties as a result of operating the project. Overall, construction and operation of the project would result in a large economic benefit for the three-county area. Additional wages and employment would grow the area economy, and tax revenues for White Pine County would increase significantly. Operation of the project would result in additional diversification of the east-central Nevada economy and help insulate the area against historic boom-bust cycles caused by heavy dependence on the metal mining industry.

The construction phase of the EEC would create a short-term population increase in the county, with a peak of up to approximately 2,500 construction workers temporarily residing in White Pine County. This population surge would increase the demand for public services and strain the local infrastructure. These impacts would be largely mitigated by construction and operation of the worker village during the construction phase.

The impact of the project would be focused on White Pine County. Construction of the Alternative Rail Line would impact Elko and White Pine Counties and the transmission lines would be constructed in portions of White Pine, Lincoln, Nye, and Clark Counties. Construction of the rail and transmission lines would be more transitory with the crews advancing along the lines as they are built. By contrast, either power plant would be sited in White Pine County and the construction workers would be located in White Pine County through the duration of the construction.

Environmental Justice

Significant minority populations of Native Americans occur in Elko, Nye, and White Pine counties, and a significant population living at or below the poverty level occurs in Lincoln County. Although minority populations are present in the general area, no minority populations were identified in the areas most likely to be directly impacted by the project. Project features would be visible from US-93 (See **Section 4.15**), and from residences in the area. The power plant would not be visible from Ely. The Proposed Action or Alternatives would not cause disproportionate harmful pollutants or environmental risks to affect low-income or minority-based communities or residences. The Proposed Action or Alternatives would not adversely

affect the ability of local agricultural operations to continue. There would be no disproportionate impacts to minority or low income populations from operation, maintenance, or abandonment of the project.

Hazardous and Solid Waste

Hazardous materials would be used during construction of the Proposed Action and Alternatives. The largest quantities of these materials would be diesel fuel, gasoline, and propane for on-site vehicles and space heating. These materials would be stored and used in compliance with federal and state regulations, including spill controls for storage areas. Compressed gas cylinders would be used for welding, cutting, and other metal work during construction. New construction requires a large variety of commercial chemical products for cleaning, joining with adhesives, painting, and other coatings which may contain flammable or toxic chemicals.

Solid wastes that would be generated and managed during construction of the project would include construction debris, municipal solid waste, workforce sewage, non-hazardous hydrocarbon and antifreeze waste, and hazardous waste.

The largest solid waste stream generated by the plant would be coal combustion byproducts (e.g., fly ash and bottom ash). These could be disposed of in a lined, on site landfill, along with synthetic gypsum from the air pollution control system and solids from on site wastewater holding ponds. The solid waste landfill would cover approximately 1,000 acres at the plant site over the life of the project. The Proponents have indicated that they intend to market the sale of certain byproducts (i.e. fly ash, bottom ash, and synthetic gypsum).

Transportation

Construction of the Proposed Action and Alternatives would result in an influx of construction workers, which would add to the Average Annual Daily Traffic (AADT) on US-93. However, with the addition of turn lanes and installation of a traffic signal at the plant site, this increase would not change the Level of Service (LOS) rating (traffic flow) of the highway (HDR et al. 2007). Further, the use of buses to transport workers from the worker village to the plant site would mitigate a substantial portion of the traffic increase. Impacts to transportation during construction would be temporary and minor. Impacts to transportation during operation and maintenance would be long-term and negligible.

COMPARISON SUMMARY OF ENVIRONMENTAL IMPACTS FOR THE PROPOSED ACTION & NORTH PLANT SITE ALTERNATIVE

IMPACT		SOUTH PLANT SITE - PROPOSED ACTION (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NORTH PLANT SITE - ALTERNATIVE (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)
Water Resources			
Acreage of wetlands impacts	ST	0	9.4
	LT	0	0.2
General groundwater impacts from water supply operations		Decline (greater than 1 foot) in ground water would occur in an area approximately 84 square miles	Same as Proposed Action
Groundwater impacts affecting springs, streams and lakes		<2 Feet of drawdown beneath the northern, ephemeral reach of Duck Creek and Goshute Lake	Same as Proposed Action
Water rights impacted by drawdown		8 Active Water Rights potentially impacted, most predicted to be between 5 and 10 feet	Same as Proposed Action
Geology and Minerals			
Potential effects on topography		Minor	Minor
Number of mining, oil, gas, and/or geothermal claims potentially impacted		0	1
Paleontological Resources			
Potential to encounter paleontological resources		Low to High, depending on area Areas with high potential: Plant site, worker village, Mt. Wheeler transmission line, Robinson Summit substation, Lages Station well field, a portion of the waterline, and rail lead.	Same as Proposed Action
Soils			
Acreage Temporarily Disturbed		9,477	8,903
Acreage Permanently Disturbed		4,536	4,310
Air Quality			
Would NAAQS be exceeded?		No	No

IMPACT	SOUTH PLANT SITE - PROPOSED ACTION	NORTH PLANT SITE - ALTERNATIVE
Operational impacts to Class I and sensitive Class II areas	• SO_2: Long-term, moderate • All others: Long-term, minor	Same as Proposed Action
Operational impacts to Class II areas	Plant site operations would not exceed federal and state limits for incremental degradation, and impacts combined with measured background concentrations would not approach national or Nevada ambient air quality standards.	Same as Proposed Action
Vegetation		
Five vegetation types with the most acreage permanently impacted, plus winterfat	• Black sagebrush – 1,339 • Douglas rabbitbrush – 1,701 • Greasewood – 127 • Salt desert shrub – 19.5 • Wyoming Sagebrush - 334 • Winterfat - 109	• Douglas rabbitbrush – 221 • Greasewood – 1,837 • Pinion-juniper – 121 • Salt desert shrub - 834 • Wyoming sagebrush – 524 • Winterfat - 35
Noxious and Non-native, invasive weed risk assessment	None to moderate, depending on area Areas of moderate risk: South plant site, worker village, Robinson Summit substation, Mt. Wheeler transmission line, Lages Station well field water supply, rail lead; transmission line segments 4A, 1D, and 11.	None to high, depending on area Area of high risk: Transmission line segment 1B Areas of moderate risk: Worker village, Robinson Summit substation, Mt. Wheeler transmission line, Lages Station well field water supply; transmission line segments 1C, 1D, and 11.
Special status plant species observation locations that could be impacted	Transmission line segments 6C and 9D	Same as Proposed Action
Wildlife Resources, Including Special Status Wildlife, Fisheries, and Aquatic Species		
Number of potentially occupied[1] sage grouse leks within 2 miles	• Transmission Lines - 19 • Water Supply Facilities – 3	Same as Proposed Action
Pygmy rabbit observation locations that could be impacted	• Worker village access road • Mt. Wheeler transmission line • Transmission line segments 4A, 1D, and 6C • Lages Station water pipeline	• Mt. Wheeler transmission line • Transmission line segments 1D and 6C • Lages Station water pipeline
Burrowing owl observation locations that could be impacted	• South plant site • Transmission line segment 4A • Lages Station water pipeline • Rail lead	• Lages Station water pipeline

[1] Includes active, inactive, and unknown leks.

IMPACT	SOUTH PLANT SITE - PROPOSED ACTION	NORTH PLANT SITE - ALTERNATIVE
Areas of pronghorn antelope range impacted	• South plant site, worker village, Mt. Wheeler transmission line • All transmission line segments north of segment 9C, excluding higher elevations • Lages Station well field and pipeline • Rail lead	• North plant site, worker village, Mt. Wheeler transmission line • All transmission line segments north of segment 9C, excluding higher elevations • Lages Station well field and pipeline • Rail lead
Impacts to fisheries and aquatic resources	None to negligible	Same as Proposed Action
Acres of desert tortoise habitat permanently impacted	81	Same as Proposed Action
Areas of mule deer crucial winter range impacts	• Mt. Wheeler transmission line • Portions of transmission line segments 1D, 4A, 6C, and 8.	• Mt. Wheeler transmission line • Portions of transmission line segments 1C, 1D, 6C, and 8.
Raptor nesting areas within 2 miles	• Ferruginous hawk: Worker village, transmission line segment 6C • Goshawk: Segment 4A	• Ferruginous hawk: North plant site, transmission line segment 6C • Goshawk: Segment 1C
Range Resources		
Number of allotments Impacted	39	35
Number of water sources potentially impacted	6	3
Number of Horse Management Areas (HMAs) Impacted	7	9
Cultural Resources		
Number of or Projected Acres of NRHP-Eligible Sites impacted	South Plant Site: 0 sites Proposed Action Total: 18 sites + 454 acres	North Plant Site: 6 sites Alternative Total: 26 sites + 456 acres
Native American Concerns		
Number of Places of Cultural and/or Geographic Interest to Tribes potentially impacted	7	Same as Proposed Action
Land Use		
Acres of BLM lands affected by the project	16,889	17,292
Acres of private, state or other agency lands affected by the project	321	354
Acres of public lands transferred into private ownership	2,477	2,479

IMPACT		SOUTH PLANT SITE - PROPOSED ACTION	NORTH PLANT SITE - ALTERNATIVE
Special Designation Areas (SDAs)			
Number of SDAs where some portion of the SDA would have long-term noise impacts		4	2
Number of SDAs where some portion of the SDA would have long-term air quality-related reduced visibility		8	12
Number of SDAs with project components within their boundary		5	4
Number of SDAs where some portion of the SDA would have long-term impacts from noise, air quality, and viewshed.		3	2
Recreation			
Overall impact to recreation		Short-term, negligible to major Long-term, negligible to moderate	Short-term, negligible to major Long-term, negligible to minor
Visual Resources			
Developments potentially not consistent with BLM Visual Resource Management Classification designation		• Transmission Line Segment 6C	• Transmission Line Segment 6C
Noise			
Noise impacts to nearest residence	ST	Minor to moderate	Minor to moderate
	LT	• Moderate in conjunction with plant site • Minor to moderate in conjunction with rail line and NNRy • Negligible for all other components	• Minor in conjunction with plant site • Minor to moderate in conjunction with rail line and NNRy • Negligible for all other components
Noise impacts to Steptoe Valley	ST LT	Minor to moderate, resulting from increased population	Same as Proposed Action
Socioeconomics			
Peak annual economic impact [2]	ST	Plant: $124,923,000 – Year 4 Electric Transmission Facilities: $104,843,000 – Year 4 Water Facilities: $2,540,741 – Year 3	Same as Proposed Action
	LT	Plant: $22,738,000	Same as Proposed Action
Estimated peak population increase	ST	Year 4 – 4,432	Same as Proposed Action
	LT	Year 7 – 805	Same as Proposed Action

IMPACT		SOUTH PLANT SITE - PROPOSED ACTION	NORTH PLANT SITE - ALTERNATIVE
Peak fiscal impact to local government	ST	Year 2: Total Property Tax - $12,661,578 Sales and Use Tax – $18,761,700	Same as Proposed Action
	LT	Year 6: Total Property Tax - $16,812,058 Total Sales and Use Tax – $637,536	Same as Proposed Action
Cities or towns potentially impacted		Ely McGill	Ely McGill Wendover
Environmental Justice			
Disproportionate effects to minority or low income populations		None to negligible	Same as Proposed Action
Hazardous Materials and Solid Waste			
Anticipated environmental effects from use of hazardous materials		Negligible	Same as Proposed Action
Transportation			
Impacts to transportation	ST	Minor to moderate	Same as Proposed Action
	LT	Negligible to minor	Same as Proposed Action

[2] Peak economic impact would be the year of greatest economic impact realized from the project component. Economic impact of construction and operation of the rail lead connecting the plant site to the NNRy not estimated due to its proportionally negligible effect.

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Chapter 1
Introduction - Purpose and Need

1.1 Introduction

This Environmental Impact Statement (EIS) was prepared in response to an SF 299 application for the Ely Energy Center (EEC) and Electric Transmission Support submitted on June 5, 2006 by Nevada Power Company (NPC), in conjunction with Sierra Pacific Power Company (SPPC). Together, these companies are referred to in this document as the Proponents. The purposes of the EIS are for the U.S. Bureau of Land Management (BLM) to evaluate and disclose potential impacts of the proposed development of the EEC power generation plant and associated facilities, and determine whether to grant rights-of-way and convey lands through direct sale.

The Proponents are proposing to develop a company owned and operated coal-fueled generating facility about 15 miles north of Ely, in Steptoe Valley, White Pine County, Nevada. The power generation site would be developed in two phases. Phase 1 would include construction and operation of two 750 megawatt (MW) ultra-supercritical, pulverized-coal fired generating units with associated support facilities. Phase 1 would also include two 500 kV electric transmission lines from the power plant to Robinson Summit; a connection at Robinson Summit to an existing 345 kV transmission line; and one 500 kV transmission line from Robinson Summit to the Harry Allen Substation, about 250 miles south in Clark County. Also included in Phase 1 would be an 8,000 acre feet per year (ac-ft/yr) well field in Steptoe Valley to supply water for the power plant and a rail lead connection to the reconstructed Nevada Northern Railway (NNRy) for transportation of coal from the NNRy connection with the Union Pacific Railroad at Shafter, in Elko County. Coal would be transported via rail from Wyoming. Phase 2 would include construction and operation of two coal gasification 500 MW generating units within the same plant site as Phase 1, additional water supplies as needed, and another 500 kV transmission line from Robinson Summit to the Harry Allen Substation (generally parallel to the Phase 1 transmission line). These project components are shown in **Figure 1.1-1**.

This EIS addresses impacts from the construction, operation and maintenance of Phase 1 of the EEC project, as well as those aspects of Phase 2 that are known at this time (40 CFR 1502.22). The Phase 2 aspects evaluated in this EIS are those related to surface disturbances from the Phase 2 power plant and transmission line. This document was prepared in compliance with the *Council on Environmental Policy*, *National Environmental Policy Act* (NEPA), (40 CFR Sec. 1500-1508); the *NEPA Handbook*, H-1790-1; and the BLM's *Ely District Office Environmental Analysis Guidebook*.

1.2 Purpose of the Proposed Action

1.2.1 BLM's Purpose for the Proposed Action

The purpose of the action is to provide public land for the development of energy production by allowing for the construction of a coal-fueled power generating plant on public lands managed by the BLM. The multiple-use mission of the BLM includes authorizing and managing activities such as mineral development, energy production, recreation, and grazing, while conserving natural, historical, cultural, and other resources on public lands. The BLM's objective is to meet public needs for use authorizations such as right-of-ways (ROWs), permits, leases, and

easements while avoiding or minimizing adverse impacts to other resource values. The proposal to construct, operate, and maintain a coal-fired power plant on public lands would be in accordance with this objective.

1.2.2 Proponents' Purpose for the Proposed Action

The purpose of the EEC is to supply 1,500 MW of reliable baseload electricity to meet baseload energy and electrical transmission needs in Nevada and the western United States, according to the PUCN Directive. To achieve this purpose, the EEC must:

- Provide at least 1,500 MW of baseload power generation capacity
- Use commercially proven and reliable technology
- Diversify energy portfolio away from natural gas
- Provide load sufficient to connect SPPC and NPC systems
- Be compatible with local conditions and available resources
- Meet the PUCN Directive

In addition to the new generation plant, a major transmission line would be developed on public lands from the Ely area south to the Las Vegas area to deliver power from the EEC and would interconnect the Proponents' electrical systems. The proposed transmission line would allow the Proponents to improve system reliability, promote diversity of supply resources, interconnect their systems, and access renewable resources in northeastern Nevada. The EEC facilities would primarily be located on federal land administered by the BLM's Ely, Elko, and Southern Nevada District Offices.

1.3 Need for the Proposed Action

1.3.1 BLM's Need for the Proposed Action

On June 5, 2006, the Proponents submitted an SF 299 *Application for Transportation and Utility Systems and Facilities on Federal Lands* to the BLM for the EEC and ancillary facilities. The need for BLM action is established by the Federal Land Policy and Management Act (FLPMA) to respond to SF 299 applications for ROW Grants and a request for land disposal. **Section 2.2.1**, *Description of BLM Actions*, describes in detail the BLM actions that would occur in response to the application for ROWs submitted for the EEC. The BLM is required to evaluate and make a decision regarding disposition of lands and the granting of rights-of-way in response to the SF 299 application for the EEC as filed by the Proponents. Under the FLPMA, the BLM is authorized to dispose of tracts that will "serve important public objectives" (43 U.S.C. 1713) and to grant rights-of-way under Title V of the Act (43 U.S.C. 1761-1771).

1.3.2 Proponents' Need for the Proposed Action

Nevada and the western United States have increasing power needs. In order for the Proponents' to meet electricity demands, as well as to improve long-term reliability and assurance of supply, construction of a new power generation plant and transmission facilities is required. The EEC would provide baseload power. A baseload facility is one that operates near full capacity 24 hours per day 7 days per week. A baseload facility must be efficient, highly reliable, and economize fuel. Often large-scale baseload facilities are fueled by coal, gas, nuclear, or hydropower.

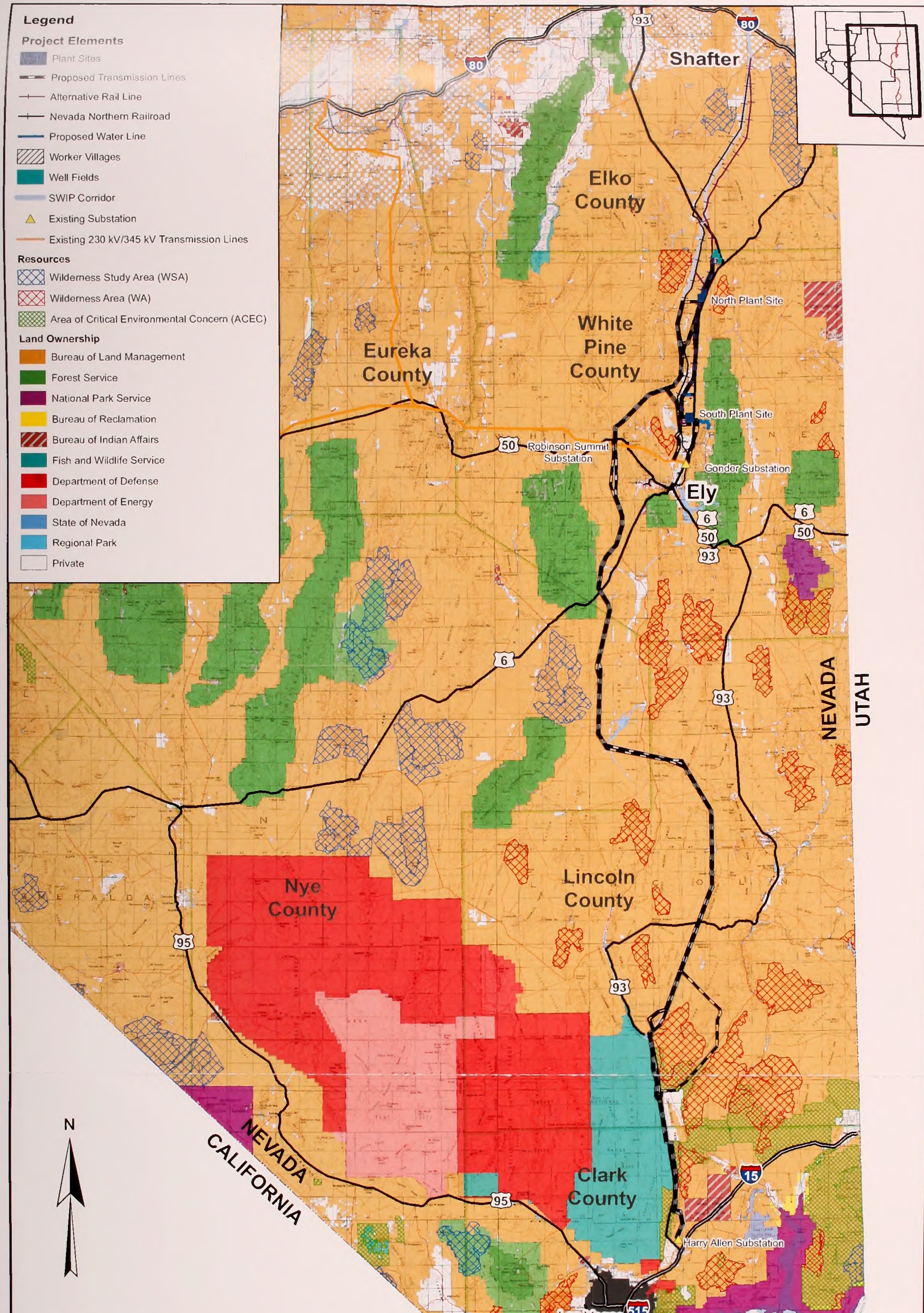

FIGURE 1-1
PROJECT LOCATION MAP SHOWING
PROPOSED AND ALTERNATE ROUTES
ELY ENERGY CENTER

The Public Utilities Commission of Nevada (PUCN) Order (November 2006; revised January 2007) acknowledges the following regarding the Proponents' objectives (PUCN 2007 p. 44 paragraph 166):

- Reduce their growing open position (the difference between power supply available from company-owned generation and/or contractual arrangements and the amount of power needed to cover customer demand plus an additional reserve requirement to cover uncertainties) at a time of impending capacity shortages;
- Upgrade and modernize their resource portfolio by adding Company-owned or controlled baseload capacity; and
- Diversify their current resource mix to provide a hedge against natural gas price volatility.

As stated in the PUCN Order (PUCN 2007 p.50 paragraph 177):

> *The stipulated load forecast...indicates that both Companies [i.e. the Proponents], and NPC in particular, will need additional baseload resources. There is also a need for the Companies to diversify their generation portfolio so that there is less reliance on natural gas and purchased power. At this time, the only practical and commercially available proven baseload resources that do not use natural gas are subcritical and supercritical coal technologies. Of these two options, supercritical technologies provide state-of-the-art emission control technology.....Therefore, the Commission finds that a supercritical coal generation facility as proposed by the Companies is the best option to provide an adequate supply of electricity at a predictable price with acceptable environmental impacts for the residents of Nevada.*

In addition, the PUCN Order acknowledged the need for the Proponents' to meet their statutory obligations by providing renewable energy developers with a transmission pathway to the market (see **Section 1.6.3**).

> *The Intertie will promote reliability, promote diversity of supply resources, assist with development of renewable resources, and promote retail price stability. It is the delivery mechanism for the output from the EEC to both Northern and Southern Nevada. In addition, the Intertie will aid in the development of renewable energy resources by allowing electricity generated by non-solar renewable resources in Northern Nevada to be delivered to Southern Nevada and electricity generated by solar resources in Southern Nevada to be delivered to Northern Nevada. Further, the Intertie will allow for the development of wind resources in Eastern Nevada to both Northern and Southern Nevada. Therefore, the Intertie will assist both NPC and SPPC to meet its statutory obligations by providing renewable energy developers with a pathway to market. (PUCN Revised Order page 58, paragraph 200).*

In order for the Proponents to meet the directives of the PUCN, the EEC has been proposed. Additional information regarding the background for the Proponents' objectives for the project is presented in **Section 1.6**.

1.4 Regulatory Authority and Decisions to be Made

The BLM has administrative responsibilities for the Federal lands upon which the Project would be located. The BLM serves as the lead agency and has included other agencies or entities to participate as cooperating agencies for purposes of EIS preparation, including the Environmental Protection Agency (EPA), the National Park Service (NPS), and White Pine County. Originally the Nevada Department of Wildlife (NDOW) and the U.S. Fish and Wildlife Service (USFWS) accepted cooperating agency status but later dropped out. The Confederated Tribes of the Goshute were also invited; however, they have not yet signed an MOU to have cooperating status. CEQ regulations emphasize agency cooperation early in the NEPA process and state that any other Federal agency, which has jurisdiction by law shall be a cooperating agency (40 CFR 1501.6).

The BLM will determine whether to authorize the requested land disposal and grant rights-of-way for the Project. The BLM will issue a Record of Decision based on analyses provided in the Final EIS.

1.5 Proposed Action Summary

The Proponents have applied to the BLM for ROWs that would allow for the development of the EEC Project. In addition to the new generation resources, the Proponents are seeking permission to develop a major transmission line from the Ely area to the Las Vegas area and to interconnect their two electrical systems for the first time within the state, allowing the two utilities (NPC and SPPC) to share generation resources, access renewable resources in northeastern Nevada and increase the diversity of power supply options. These facilities would primarily be located on federal land administered by the BLM's Ely, Elko, and Southern Nevada District Offices.

The proposed general project area is shown in **Figure 1.1-1**. The Proposed Action (South Plant Site) and the North Plant Site Alternative for the EEC power plant are both located in the Steptoe Valley of White Pine County, Nevada. Water supplies would include wells and pumping facilities, water pipeline(s) and related facilities in Steptoe Valley. Linear project elements providing rail service would reach north into Elko County and electric power transmission would reach south through Nye and Lincoln Counties to terminate in Clark County.

The EEC Project would be developed in two phases. Phase 1 of the project includes the construction of a new 1,500 MW coal-fueled electrical generation facility (two 750 MW units) and the associated water supply, electrical transmission, switchyard, communication facilities, and road and railway infrastructure.

Phase 1 of the EEC would include:

- Two coal-fueled 750-MW ultra-supercritical[1] steam turbine units and associated site facilities.

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[1] "Ultra-supercritical" is a reference to the physics of generating steam at higher pressure and temperature; beyond these points, steam is no longer a mixture of steam and water requiring separation in a traditional drum design, and is physically a single fluid that passes through a boiler to drive a steam turbine generator. This new technology reduces fuel consumption and emissions by 5 to 10 percent over conventional "sub-critical" technologies, providing previously unrealized efficiency and operating cost benefits.

- Water supply, including water wells, surge tanks, pipelines, pipeline access road and pumping stations to the EEC, and a raw water storage pond on the plant site.
- Communications systems and a 69-kV power line to provide electrical service for the water supply pump stations, construction workforce temporary housing, and construction power to the EEC.
- Rail line and associated facilities and infrastructure for connection from the power plant to the existing Union Pacific RR at Shafter in Elko County. This would consist of a rail lead connection to the reconstructed NNRy, if available, or construction of an alternate new rail line from the power plant to Shafter.
- Permanent and temporary access roads from the public road system to the facilities.
- Water well at the plant site for construction water for the EEC.
- Temporary housing ("worker village") for the construction workforce (on private property).
- Access roads into and along all of the linear facilities.

The electrical transmission facilities associated with Phase 1 would include:

- A new 500-kV switchyard at the EEC.
- A new 500/345-kV substation near Robinson Summit and two 500-kV transmission and fiber optic lines from the EEC to Robinson Summit Substation;
- A loop-in of the existing SPPC Falcon – Gonder 345-kV transmission line.
- A 500-kV transmission and a fiber optic line from Robinson Summit Substation to Harry Allen Substation.
- An expansion of the 500-kV Harry Allen Substation.
- Access roads into and along all transmission lines.

Phase 2 of the EEC would include:

- Two coal gasification 500-MW units and associated site facilities at the same plant site as Phase 1.
- Additional water supplies as required.
- A 500 kV transmission and a fiber optic line from Robinson Summit to the Harry Allen Substation, generally parallel to the Phase 1 transmission line.

The Proposed Action evaluated in this EIS includes all components of Phase 1 and the surface disturbances related to the Phase 2 power plant and transmission line. Phase 2 would require further NEPA analysis in the future when the generation and water supply facilities for Phase 2 have been designed.

A more complete description of the Proposed Action elements and other project alternatives is included in **Chapter 2**.

1.6 Background

1.6.1 Population Growth in Nevada

The 2004 and 2005 population estimates from the U.S. Census Bureau showed Nevada as the fastest growing state in the United States. For the 19th consecutive year, Nevada has led the nation in population growth. Nevada's population grew by 24.9 percent from April 1, 2000 to July 1, 2006. This compares to the nation's population rise of 6.4 percent over the same period (U.S. Census Bureau 2006).

The Proponents' service territory comprises over 95 percent of the state's population; 71.5 percent of the state's population resides in Clark County, and approximately 23.5 percent reside in Northern Nevada.

1.6.2 Proponent History

Nevada Power Company and Sierra Pacific Power Company are wholly owned subsidiaries of Sierra Pacific Resources, a holding company incorporated under the laws of the State of Nevada. Their combined service areas cover approximately 54,000 square miles with more than 1 million customers throughout Nevada and in northeastern California.

Specifically, NPC serves more than 770,000 electricity customers in Las Vegas, North Las Vegas, Henderson, and other communities and homes in Clark and Nye Counties. NPC's service territory encompasses nearly 4,000 square miles. NPC faces the challenge of a phenomenal 6 percent annual growth rate, the highest of any electric utility in the country.

SPPC encompasses more than 50,000 square miles in western, central and northeastern Nevada and northeastern California and serves approximately 300,000 customers. The annual growth rate of SPPC's service territory is approximately 2 percent. The combined 5 percent growth rate of both Companies translates to a need of approximately 250 to 300 MW of additional electricity generating capacity each year.

1.6.3 Regulatory Requirements

The Proponents are regulated by the PUCN and the Federal Energy Regulatory Commission (FERC). Nevada adopted its first comprehensive statutory least-cost utility planning process in 1983. This is now referred to as the Integrated Resource Planning Process. This planning process requires all Nevada retail electric distribution utilities under the jurisdiction of the PUCN to file an Integrated Resource Plan (IRP) every two years detailing their future 20-year resource acquisition strategy to meet customer growth. The IRP is based on forecasts of customer load requirements, and is required by statute to include plans to meet load growth.

In 2006, the Proponents developed their IRP to optimize energy supply using a portfolio approach (diversity of fuel supply, renewables, and conservation), which sought to balance the cost of electricity, supply, reliability, fuel, short-term and long-term power market volatility, and environmental acceptability. The 2006 IRP made significant progress toward reducing the Proponents' dependence on natural gas generated electricity and the customers' exposure to volatile gas and power markets.

In the IRP, the Proponents proposed:

- Ultra-supercritical pulverized coal units for the EEC.
- An aggressive conservation program.

- Commitments to promote renewable energy development.
- Investments in transmission infrastructure to bring new, renewable energy resources to market.

In June 2006, NPC filed its IRP for 2007-2026, followed by SPPC's July submittal of the 13th Amendment to their 2005-2024 IRP (Docket Nos. 06-06051 and 06-07010). The IRP filings reflected the electrical needs of the state for the next 15 years. The PUCN subsequently consolidated the filings and issued an Order in November 2006 (a Revised Order was issued January 2007), which approved the Proponents' request to proceed with the development of Phase 1 of the EEC and accompanying transmission line - including the expenditure of $300 million for permitting, railroad upgrades, and equipment purchases. The PUCN focused its Order on:

- The Proponents' large and growing "open position" (the difference between available power supply and customer demand plus reserve) at a time of impending capacity shortages.
- The Proponents' aging fleet of coal-fueled plants.
- The need to upgrade and modernize the Proponents' resource portfolio by adding company-owned or controlled baseload capacity.
- Diversification of the resource mix to provide a hedge against natural gas price volatility.
- The cost consequences associated with a delay in the development of coal-fueled generation, expected to be between $200 and $300 million per year.
- The lack of PUCN control over independent power producers' generation development.

1.6.4 Growth in Forecasted Demand

The need for additional generating resources in Nevada is well supported and recognized by state and local leaders. Consistent with the Nevada Governor's 2001 plan, the Proponents already have constructed almost 3,000 MW of new company-owned generation in Nevada to help offset the reliance on formerly stable energy markets, whose sudden volatility during the Western Energy Crisis had adverse effects on the economy of the state. Most of this generation, however, is natural gas-fired and designed to run during peak need times during the summer. What is still needed is a reliable source of self-generated low-cost "baseload" energy for the year-round demand.

The combined growth rate of the Proponents' energy demand translates to approximately 250 to 300 MW of additional capacity required each year resulting in greater electricity demands per capita than most other regions. Meeting load growth is a requirement of regulated utilities under Nevada State law (NRS 704).

In the early years of this high-growth cycle, the Proponents operated in a regional environment of abundant, low-cost generation. Historically, the Proponents purchased approximately one-half of all the energy delivered to their customers from third-party providers. But given the dramatic price shifts and power shortfalls experienced during the Western Energy Crisis from 2000-2001 there is a need to remedy this heavy reliance on outside purchases.

Due to a deficit of company-owned generation, the Proponents currently compete for both fuel and generation resources within the Western Electricity Coordinating Council (WECC) Desert Southwest and Northwest Power Pool sub-regions. The WECC region encompasses an area of

nearly 1.8 million square miles. It is the largest and most diverse of the eight regional councils of the North American Electric Reliability Council (NERC) serving the 14 Western States, including Nevada and California. WECC and the seven other regional reliability councils were formed to respond to national concerns regarding the reliability of the interconnected bulk power systems, the ability to operate these systems without widespread failures in electricity service, and the need to foster the preservation of reliability through a formal organization. Traditionally, the difference between the amount of generating resources available to the Proponents (from company-owned generation or contractual arrangements) and the amount of power needed to cover customer demand, plus an additional reserve requirement to cover uncertainties is known as the Proponents' "open position." Electricity needed to cover this open position is purchased on the open market through contracts and short-term purchases.

Based on data from the WECC, as load demand in the Proponents' service territories continues to grow, opportunities for Nevada to purchase power from other Western states is projected to diminish, as other electricity generating facilities will be required to serve additional load in their local territories. This expected loss of opportunity to purchase power, the need to reduce price volatility, the importance of increased fuel diversity and assurance of supply, and the need to maintain and improve reliability, requires the Proponents to develop company-owned generation. This self-reliance strategy is in accordance with Governor Guinn's 2001 Nevada Energy Protection Plan that calls for increased development of generation resources within the state to serve customers within Nevada.

The need for additional power sources is due not only to dramatic customer growth in the Proponents' service areas (approximately 55,000 new customers per year), but the fact that individual customers' electricity consumption continues to rank among the highest in the nation. This is due primarily to air conditioning demand during the hot summer months. In 2005, NPC experienced a system peak of 5,563 MW, an increase of approximately 300 MW from the previous year. SPPC experienced a system peak of 1,686 MW, an increase of approximately 50 MW. Forecasted peak loads for 2007 in the Desert Southwest sub-region exceed 7,000 MW. By 2015, peak loads are expected to surpass 9,000 MW (WECC 2006).

1.6.5 Fuel Source Constraints

Following the Western Energy Crisis in 2000-2001, the WECC region responded with new generation construction, but notably 93 percent of the capacity additions were fueled primarily by natural gas. Natural gas pricing has exhibited noteworthy volatility in recent years and the price of fuel used to generate electricity is passed through to the customer by utilities. This continued dependence on natural gas-fueled generation exposes the Proponents' customers to price volatility and uncertainty of adequacy of supply in the long term.

The outlook for new supply sources of natural gas to make up for declining production and serve future growth is uncertain. U.S. domestic production and development of natural gas is forecasted to increase over the next 20 years. At the same time, pipeline imports from Canada, another principal supply source for U.S. gas consumption, are forecasted to decline. The result is a projected increased reliance on imports of foreign sources of natural gas production, referred to as liquefied natural gas (LNG).

This heavy reliance on natural gas fired electricity generation continues through the Proponents' existing fuel sources for the immediate future. It is expected that the energy power sources for the Proponents in 2008 will consist of 41 percent natural gas, 29 percent purchased power, 21 percent coal, and 9 percent from renewable energy sources. Because almost all of the

purchased power is generated by natural gas, nearly 70 percent of the Proponents' total energy will be generated from natural gas sources in 2008. This situation places the Proponents and their customers in a vulnerable position in terms of both cost and availability of baseload energy supply. However, with the completion of Phase 1 of the EEC, the dependence on natural gas would drop with a predicted 2015 power mix of 22 percent natural gas, 12 percent purchased power, 46 percent coal, and 20 percent renewables.

1.6.6 Proponents' Objectives

The Proponents are regulated utilities. As such, the Proponents' objectives below are in direct response to the directives provided by the PUCN in the Revised Order (PUCN Revised Order, pages 55-58) described in **Section 1.6.3**. Specifically, the objectives of the Proponents' Proposed Action are to:

- **Provide a reliable, relatively low-cost electrical supply to meet the high annual population growth of the Proponents' service area through 2015.** Under Nevada State law, the Proponents must meet the load growth due to continued high population growth in the service area. Without new power generation, the gap between the amount of future load and desired reserves and the availability of generation sources will increase. The Proponents' open position (representing the short-term need between the power sources and the peak load and power reserve) would then increase from approximately 2,000 MW to 4,000 MW between 2007 and 2015. The open position would increase after 2012, as older units owned by the Proponents are currently expected to be retired.

- **Comply with legislative and state directives to create new, diverse, baseloaded sources of fuel supply to help insulate customers from volatile price fluctuations of purchased power and provide a balance of resource diversity well into the future.** Because of Nevada's rapid economic growth, plus the lessons learned from over-reliance on the power purchase markets several years ago, the Proponents have committed to deliver a diverse power portfolio, including the EEC, which protects their current and future customers against the volatility of fluctuating natural gas fuel costs and swings in the purchase power markets.

- **Connect the Sierra Pacific Power and Nevada Power electric systems to improve system reliability and flexibility.** This transmission line intertie would allow SPPC and NPC to share energy resources, be more efficient, and better support each other during power emergencies. Today, the Proponents' transmission systems are not connected within Nevada.

- **Provide better access to the state's renewable energy resources.** There are numerous wind energy and geothermal renewable projects in various stages of planning or development in northern and eastern Nevada. A critical part of developing these renewable resources is providing the electric transmission infrastructure to move the power from the sources to the customers. The two high-voltage transmission lines being proposed have capacity to carry all the power generated by the EEC as well as up to an additional 800 MW for the first line and 1,500 MW for both lines together which would enable other power sources, including renewable energy, to interconnect and transmit power from these remote locations to major load centers in Las Vegas and Reno. Nevada's Renewable Portfolio Standard mandates that 20 percent of Nevada's electricity come from renewable sources by 2015 (Nevada Assembly Bill 385 Section 22,

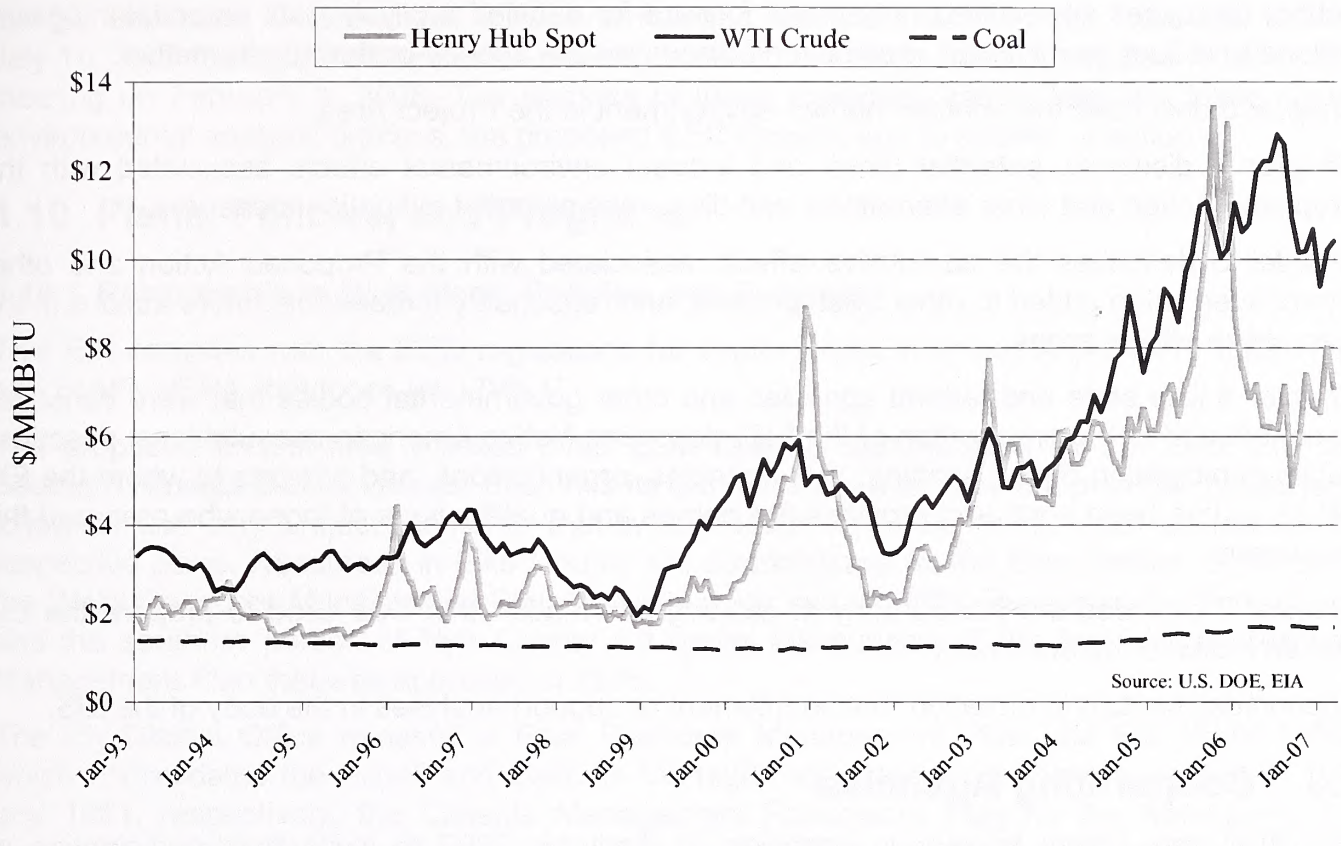
2005). The ability for renewable generation facilities to more easily tie into the existing transmission system is critical to meeting this standard.

- **Decommission older, less-efficient, coal and natural gas plants to conserve natural resources and help to mitigate air emissions.** Some of the Proponents' current generating plants are of older, less efficient designs. These less efficient plants burn more fuel per MW generated than modern, more efficient plants resulting in greater air emissions. After the EEC is built, the Proponents' current plans call for the retirement of three aging coal units at the Reid Gardner Station in southern Nevada.

1.6.7 How the Proposed Action would Respond to the Proponents' Need

The Proposed Action would reduce the need for imported electricity and would diversify the fuel supply portfolio. Development of commercially-proven, coal-fired generation would offset the approximately 70 percent reliance on natural gas generation and the inherent volatility of natural gas prices in the marketplace. **Figure 1.6-1** shows the recent volatility of prices for energy from natural gas (Henry Hub Spot) and crude oil (WTI Crude) in the marketplace, compared to the relatively stable cost for coal. These fluctuating costs are passed through to ratepayers, and are largely outside of the Proponents' control. Replacing the natural gas components of the fuel mix with self-owned generating capacity using lower cost fuel could reduce these volatile price risks to the Proponents' customers. The Proposed Action would provide an immediate addition of new baseloaded, commercially proven, power generation to alleviate the shortage of existing capacity and allow the flexibility to more easily add power generated from renewable resources in the northern portions of the State. Nevada's Renewable Portfolio Standard mandates that 20 percent of Nevada's electricity come from renewable sources by 2015 (Nevada Assembly Bill 385 Section 22, 2005).

Developing new coal-fired generation capacity using environmentally and technologically efficient units would allow for the retirement of older, less efficient units currently in service. These older units also do not utilize state-of-the art pollution-control equipment. Retiring these units and effectively replacing them with more efficient generation units would conserve the use of natural resources and help reduce overall emissions, including greenhouse gases. After the EEC is built, the Proponents are planning to retire the current operation of three aging coal units at the Reid Gardner Station in southern Nevada. With the anticipation of EEC, NPC would also not participate in efforts to restart the coal-fired Mojave Power Plant.



Henry Hub Spot = natural gas
WTI Crude = crude oil

Figure 1.6-1. Historic oil and natural gas wholesale prices in the U.S.

1.7 About This Document

This document follows regulations promulgated by the Council on Environmental Quality (CEQ) for implementing the procedural provisions of the National Environmental Policy Act (NEPA) (40 CFR 1500-1508); the BLM NEPA Handbook, H-1790-1; the Ely District Office Environmental Analysis Guidebook; and Sections 201, 202, and 206 of the Federal Land Policy and Management Act of 1976 (FLPMA) (43 CFR 1600). This EIS describes the components of and reasonable alternatives to the Proposed Action, and environmental consequences of this action and the alternatives.

In order to provide the BLM with flexibility in developing an Agency Preferred Alternative, the alternatives were broken down into individual components or elements for the environmental impact analysis.

The EIS is divided into several chapters for ease of reading and to better organize information for decision-making.

Chapter 1 provides general background, the purpose of and need for the Proposed Action; roles of the BLM and cooperating agencies; decisions to be made and authorities regulating the process of analysis and disclosure; a summary of public participation in the EIS process; and key issues to be addressed.

Chapter 2 presents a reasonable range of alternatives to address the stated need and purpose for the project, including the Proposed Action, No Action, and other alternatives to the Proposed

Action; discusses alternatives not carried forward for detailed analysis; lists potential mitigation actions to reduce or minimize impacts; and discusses the agency-preferred alternative.

Chapter 3 describes the affected human environment in the Project Area.

Chapter 4 discloses potential direct and indirect environmental effects associated with the Proposed Action and other alternatives and discusses potential mitigation measures.

Chapter 5 describes the cumulative effects associated with the Proposed Action and other alternatives when added to other past, present, and reasonably foreseeable future actions in the cumulative effects areas.

Chapter 6 lists state and federal agencies and other governmental bodies that were consulted or contributed to the preparation of the EIS; describes Native American consultations; describes public participation during scoping; lists agencies, organizations, and persons to whom the EIS will be or has been sent; and provides the names and qualifications of those who prepared this document.

Chapter 7 provides the bibliography of existing information that was used to prepare the EIS and an index to the document.

Appendices contain information that supplement or support analyses in the body of the EIS.

1.8 Cooperating Agencies

The BLM sent letters to various agencies on April 18, 2007 to invite their participation as cooperating agencies for the NEPA process and EIS documentation. Later, through further consultation, the Confederated Bands of the Goshute Tribe asked to be a cooperating agency; a Memoranda of Understanding (MOU) between the BLM and the Tribe is in the process of being completed. The list of cooperating agencies includes:

- National Park Service (represented by Great Basin National Park)
- U.S. Environmental Protection Agency
- White Pine County
- Confederated Bands of the Goshute Tribe (invited)

Cooperating agencies are invited to participate in the entire NEPA process including: review of analyses, contribution of technical expertise, and assisting in the response to public comments, required by their jurisdiction or regulatory authority. MOUs were developed between cooperating agencies and the BLM.

1.9 Native American Consultation

The public scoping letter for the EEC Project was sent to tribes and tribal organizations on January 26, 2007. Tribal liaisons have regularly briefed tribes on the EEC Project since then. The tribes received a second correspondence letter (EEC Project Notice) regarding the project on May 4, 2007. As part of Government-to-Government consultation, Native American consultation letters were sent out by the BLM, Ely District Office on July 23, 2007 to the tribes and tribal organizations.

The BLM met with members of the Goshute Tribal Council on February 8, 2007 and March 14, 2008 to discuss the project and potential tribal issues. It was agreed that the parties would have further discussions about the project and the Tribal Council's interests. A meeting was held with

the Ely Shoshone Tribe on April 4, 2007. A meeting with the Kaibab Paiute Tribe was held on July 18, 2007 during the tribal council meeting and with the Wells Band during their tribal council meeting on February 1, 2008. The purpose of these meetings was to brief the tribes on the environmental analysis process, the proposed EEC Project, and to answer questions.

1.10 Plans, Policies, and Programs

1.10.1 Relationship to BLM Plans, Policies, and Programs

This EIS complies with the CEQ regulations for implementation of NEPA (40 CFR 1500-1508) and BLM's NEPA Handbook (H-1790-1).

The proposed project area crosses three BLM Districts administered by the Elko, Ely, and Southern Nevada District Offices. Each has its own land use management plan that needs to be followed, and any project elements that would occur on those lands must adhere to the respective plans. Resources in Elko County are administered by the Elko District Office under the Wells Resource Management Plan that was approved in 1985. Resources in Clark County and the southern portion of Nye County fall under the purview of the Las Vegas Resource Management Plan that was approved in 1998.

The Ely District Office released a Final Resource Management Plan and EIS (BLM 2008a) which consolidates the Schell and Caliente Management Framework Plans approved in 1983 and 1981, respectively, the Caliente Management Framework Plan for the Management of Desert Tortoise Habitat approved in 2000, and the Egan Resource Management Plan approved in 1987. The Final Resource Management Plan was released on August 20, 2008. The other three plans are no longer in force.

The Proposed Action would be in conformance with the land use plans' terms and conditions as required by 43 CFR 1610.5.

1.10.2 Relationship to Non-BLM Plans, Policies, and Programs

The Proposed Action is consistent with other federal, state, and local agency plans, policies and programs by incorporating data, and adopting mitigation strategies and incorporating management recommendations where appropriate. Following is a partial list of state and local plans that have been reviewed:

- Nevada Natural Heritage Program
- Nevada Division of Wildlife - Big Game Status and Quota Recommendations
- Governor's Sage Grouse Conservation Management Plan
- Nevada Recreation Management Strategy and Implementation Plan
- Statewide Comprehensive Outdoor Recreation Plan
- Elko County Land Use Plan
- White Pine County Land Use Plan
- White Pine County Elk Plan
- Lincoln County Land Use Plan
- Southeast Lincoln County Multiple Species Habitat Conservation Plan
- Nye County Land Use Plan
- Clark County Land Use Plan

- Clark County Multiple Species Habitat Conservation Plan

1.11 Applicable Laws and Regulations

Table 1.11-1 lists federal and state laws and regulations potentially applicable to the Proposed Action and other action alternatives.

TABLE 1.11-1. LAWS AND REGULATIONS THAT MAY BE APPLICABLE TO THE PROPOSED ALTERNATIVES

LAWS AND REGULATIONS	STATUTORY REFERENCE
FEDERAL	
National Environmental Policy Act (NEPA)	42 USC 4371 et seq.
Council on Environmental Quality (CEQ) general regulations implementing NEPA	40 CFR Parts 1500-1508
Department of the Interior's (DOI) implementing procedures and proposed revisions	65 FR 52211-52241
Bureau of Land Management's (BLM) NEPA Handbook H-1790-1 (2008)	
National Historic Preservation Act (NHPA) and regulations implementing NHPA	16 USC 470 et seq.
Antiquities Act of 1906	16 USC 431 et seq.
Archeological Resources Protection Act, as amended (ARPA)	16 USC 470aa et seq.
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)	25 USC 3001-30013 et seq.
Clean Air Act (CAA)	42 USC 7401 et seq.
Clean Water Act (CWA)	33 USC 1251 et seq.
Endangered Species Act (ESA)	16 USC 1531 et seq.
Noise Control Act of 1972, as amended (NCA)	42 USC 4901 et seq.
Occupational Safety and Health Act (OSHA)	29 USC 651 et seq. (1970)
Pollution Prevention Act of 1990 (PPA)	42 USC 13101 et seq.
Safe Drinking Water Act of 1974 (SDWA)	42 USC s/s 300f et seq.
Migratory Bird Treaty Act	16 USC 703–711
American Indian Religious Freedom Act of 1978	42 USC 1996
Federal Land Policy and Management Act of 1976 (FLPMA)	USC 1701 et seq.
Lacey Act as amended	18 USC 42
Nuisance Prevention and Control Act of 1990 as amended	16 USC 4701 et. seq.
Federal Noxious Weed Act of 1974 as amended by the Food, Agriculture, Conservation and Trade Act of 1990, Section 1453 "Management of Undesirable Plants on Federal Lands"	U.S.C. 2801 et. seq.
Federal Plant Pest Act	7 USC 150aa et. seq.
Carlson-Fogey Act of 1968	Public Law 90-583
Salt Cedar and Russian Olive Control Demonstration Act	Public Law 109-320
Safe, Accountable, Flexible, Efficient Transportation Equity Act	Public Law 109-59

LAWS AND REGULATIONS	STATUTORY REFERENCE
Noxious Weed Control and Eradication Act	Public Law 108-412
NEPA, Protection and Enhancement of Environmental Quality	Executive Order 11512
National Historic Preservation	Executive Order 11593
Floodplain Management	Executive Order 11988
Protection of Wetlands	Executive Order 11990
Federal Compliance with Pollution Control Standards	Executive Order 12088
Environmental Justice	Executive Order 12898
Indian Sacred Sites	Executive Order 13007
Consultation and Coordination with Indian Tribal Governments	Executive Order 13084
Invasive Species	Executive Order 13112
Consultation and Coordination with Indian Tribal Governments	Executive Order 13175
Migratory Birds	Executive Order 13186
Memorandum for the Heads of Executive Departments and Agencies (signed by President Clinton on April 29, 1994)	
Memorandum on Government-to-Government Relations with Native American Tribal Governments of 1994	
Departmental Responsibilities for Indian Trust Resources	512 DM 2.1
Responsibilities, and the Endangered Species Act, Secretarial Order 3206 (June 5, 1997)	
BLM Land Use Permits and Leases	43 CFR 2920
BLM land disposition – sales regulations	43 CFR 2700, 43 CFR 2920
BLM right-of-way regulations	43 CFR 2800, 43 CFR 2920
Resource Conservation and Recovery Act (RCRA)	
Comprehensive Environment Response, Compensation, and Liability Act (CERCLA)	
STATE OF NEVADA	
Nevada Critically Endangered Flora Law	NRS 5.27-5.33
Utility Environmental Protection Act	NRS 704.820-704.900
Control of Noxious Weeds	NAC 555.010

1.12 Permits, Licenses, and Other Requirements

Table 1.12-1 lists federal, state, county, and other permits and approvals that may be needed to implement the Proposed Action or other action alternatives.

TABLE 1.12-1. PERMITS AND LICENSES THAT MAY BE APPLICABLE TO THE PROPOSED ALTERNATIVES

ACTION REQUIRING A PERMIT, REVIEW, OR APPROVAL	PERMIT/ APPROVAL	ACCEPTING AUTHORITY/APPROVING AGENCY	STATUTORY/ REGULATORY REFERENCE
FEDERAL			
All project elements or disturbance on BLM administered lands	Rights-of-Way Grant; Land Disposal;	BLM	43 CFR 2800
Rights-of-Way Grant; Land Disposal	EIS; Record of Decision	BLM	40 CFR Part 1500-et.seq.
Right-of-Way Grant/ Land Disposal	NHPA, Section 106 review and concurrence	BLM; Nevada State Historic Preservation Office	36 CFR Part 800 16 USC 47
Right-of-Way Grant/ Land Disposal	ESA, Section 7 consultation and concurrence	BLM; U.S. Fish and Wildlife Service; Nevada Division of Wildlife	50 CFR Part 17 16 USC 1536
Construction of chimney and structure locations if the structure is more than 200 feet	No Hazard Determination	Federal Aviation Administration	49 USC 1501 14 CFR 77
Operation of proposed facilities	Acid Rain Permit (CAA, Title IV)	U.S. Environmental Protection Agency	42 USC 7401 40 CFR 76
Storage of petroleum	Spill Prevention Control and Countermeasure	U.S. Environmental Protection Agency	40 CFR 112
Storage of hazardous materials	Risk Management Plan	U.S. Environmental Protection Agency	40 CFR Part 68
Dredge or fill activities in Waters of the United States	CWA, Section 404 Permit	U.S. Army Corps of Engineers	33 USC 1344
STATE OF NEVADA			
Surface disturbing activities	Section 106 Determination of Effect Concurrence	State Historic Preservation Office	16 USC 470 et seq. NRS 383
Facilities construction	Utility Environmental Protection Act – Permit to Construct	Nevada Public Utility Commission	NRS 704.820-704.900 NAC 704.9063, NAC 704.9359 – 704.9361
Surface disturbing activities	Rare and Endangered Plant Permit	Nevada Division of Forestry	NRS 527.260-527.300

ACTION REQUIRING A PERMIT, REVIEW, OR APPROVAL	PERMIT/ APPROVAL	ACCEPTING AUTHORITY/APPROVING AGENCY	STATUTORY/ REGULATORY REFERENCE
Surface disturbing activities	Native Cacti and Yucca Commercial Salvaging and Transportation Permit	Nevada Division of Forestry	NRS 527.050-527.110
Surface disturbing activities	Incidental Take Permit	Nevada Division of Wildlife	NRS 503.584-503.589
Facilities construction	Prevention of Significant Deterioration (PSD) / Class I Air Quality Operating Permit to Construct	Nevada Division of Environmental Protection	NRS 445.401-445.601 NAC 445B.001-445B.395
Construction of proposed facilities	Construction Permit	Nevada Division of Environmental Protection, Bureau of Air Pollution Control	NAC 445B 42 USC 7401
Operation of proposed facilities	Operating Permit (CAA, Title V)	Nevada Division of Environmental Protection, Bureau of Air Pollution Control	NAC 445B 42 USC 7401
Impacts to water quality associated with discharges to Waters of the United States	CWA, Section 401 Permit	Nevada Division of Environmental Protection, Bureau of Water Quality Planning	33 USC 1251 et seq.
Impacts to groundwater quality associated with discharges	Ground Water Discharge Permit	Nevada Division of Environmental Protection, Bureau of Water Pollution	NRS 445A.300-445A.730 NAC 445A.070-445A.348 NAC 445A.810-445A.925
Facilities construction	CWA, Section 402 National Pollutant Discharge Elimination System (NPDES) Notification for Stormwater Management during Construction	Nevada Division of Environmental Protection	33 USC 1251 et seq.
Facilities operation	CWA, Section 402 NPDES during Operation	Nevada Division of Environmental Protection	33 USC 1251 et seq.
Surface disturbing activities	Surface Area Disturbance Permit	Nevada Division of Environmental Protection	NRS 519A.180 (for small sites) NAC 445B
Construction of access road to U.S. Highway 93 (US-93) and crossing of a U.S. Highway with a transmission line and/or railroad line	Right-of-way Occupancy Permit	Nevada Department of Transportation	NRS 408.423, 408.210 NAC 408
Transportation of Hazardous Materials	Uniform Permit	Nevada Department of Public Safety	NAC 459.979

ACTION REQUIRING A PERMIT, REVIEW, OR APPROVAL	PERMIT/ APPROVAL	ACCEPTING AUTHORITY/APPROVING AGENCY	STATUTORY/ REGULATORY REFERENCE
Application for water rights	Assignment of Water Rights	Nevada Division of Water Resources (State Engineer)	NRS 533-534
Surface disturbing activities	Dust Control Permit	Nevada Department of Environmental Quality	NAC 445B
Construction of evaporation ponds	Industrial Artificial Pond Permit	Nevada Department of Wildlife	NRS 502.390
LOCAL/COUNTY			
Construction and operation in Clark County	Special Use Permit	Clark County Board of Commissioners	Clark County Zoning Ordinance
Construction/fugitive dust – PM_{10} in Clark County	Dust Control Permit	Clark County Department of Air Quality Management	321.001, 40 CFR Subpart C, 42 USC 7408-7409
Construction and operation in Elko County	Special Use Permit	Elko County Board of Commissioners	Elko County Zoning Ordinance
Construction and operation in Lincoln County	Special Use Permit	Lincoln County Board of Commissioners	Lincoln County Zoning Ordinance
Construction and operation in Nye County	Special Use Permit	Nye County Board of Commissioners	Nye County Zoning Ordinance
Construction and operation in White Pine County	Special Use Permit or Zoning Change	White Pine County Board of Commissioners City of Ely	White Pine County Zoning Ordinance

1.13 Summary of Public Scoping and Issue Identification

1.13.1 Public Scoping and Issues

The issues evaluated in this EIS are derived from public comments made during the scoping period and summarized in the EEC EIS Scoping Summary issued in April 2007 (BLM-JBR 2007). In that document, the comments received during scoping from agencies and the public were summarized into categories, which became the basis for defining issues and indicators. The defined issues are presented under the components of the human and natural environment that are customarily addressed in impact analysis, along with the section of the EIS that addresses that particular issue.

Additional information on the scoping process is provided in **Section 6.1**.

1.13.2 Issues Raised During Scoping

Air Resources

- Construction and operation of the project may increase air borne pollutants and negatively affect human health, local economies, wildlife and special status species. (**Section 4.6**)
- Construction and operation of the project may impact regional air quality in the Great Basin and “down-winders”. (**Section 4.6**)

- Steam from plant operation may create/increase fog, smog, and weather inversions in Steptoe Valley. (**Section 4.6.2.1**)
- The Project could cause air quality impacts to Great Basin National Park, nearby designated wilderness areas, and other protected or important airsheds. (**Section 4.6.2.1**, Operations, Ambient Air Quality Impacts)
- The project may contribute to global warming. (**Section 4.6**)

Cultural Resources

- Cultural resource sites, historic properties, historic buildings, and heritage values may be impacted (directly and/or indirectly) in the Project Area. (**Section 4.10**)

Cumulative Effects

- The cumulative impacts of the project need to be disclosed. (**Chapter 5**)

Environmental Justice

- Environmental justice considerations need to be addressed in the EIS. (**Section 4.18**)
- The negative environmental impacts of the proposed project may be borne by local residents while the benefits of the power produced will be exported to other communities. (**Section 4.18**)

Geology and Minerals

- The project may affect locatable and saleable mineral deposits and operations, and oil & gas and geothermal leases. (**Section 4.3**)

Hazardous Materials and Solid Wastes

- Construction and operation of the project may release hazardous compounds into the air, water, and soil that may affect human and environmental health. (**Sections 4.6 and 4.19**)

Land Use and Access

- The project could negatively impact the limited amount of private property available in the area. (**Section 4.12**)
- The project may change the rural character of the area and the traditional and historic land use patterns. (**Section 4.12**)
- Additional roads/access created by the project may increase recreational access and risk of fire and weed invasion. (**Sections 4.7, 4.12, and 4.14**)
- Transmission towers and electromagnetic emissions may pose a hazard to low flying military aircraft in the Low Altitude Tactical Navigation Area. (**Section 4.12.4.2**)

Native American Concerns

- Construction and operation of the project may impact Native American Tribes in the area. (**Section 4.11**)
- The project may impact Indian Trust Assets. (**Section 4.11**)
- There may be Environmental Justice Impacts to local Native American Tribes. (**Sections 4.11 and 4.18**)

Noise

- Construction and operation may cause noise impacts on surrounding areas. (**Section 4.16**)

Paleontology

- No issues were identified in the public scoping process regarding paleontology. However, potential impacts to paleontological resources are addressed in **Section 4.4**.

Public Health and Safety

- Air pollution may cause health problems for people in surrounding communities and distant locations. (**Section 4.6**)
- The project may cause public safety hazards such as traffic accidents due to colder weather, inversions, fog, and black ice. (**Section 4.6.2.1** and **Section 4.20**)
- The medical and emergency care providers/facilities may not be adequate for the influx of workers and increased population associated with the project. (**Section 4.17**)

Range Resources

- The project may cause health and safety impacts to livestock. (**Section 4.9**)
- Grazing allotments may be degraded and will be fragmented by project construction and operation activities. (**Section 4.9**)
- The project may cause socioeconomic hardships on livestock operators/ranchers. (**Sections 4.9 and 4.17**)

Recreation

- The area may be less desirable for outdoor recreation and tourism. (**Section 4.14**)
- Short-term residents, such as construction workers, may have little concern or value for public lands and sensitive areas. (**Section 4.14**)

Socioeconomic Resources

- The project may impact socioeconomic conditions of local communities. (**Section 4.17**)
- The project may cause a utility rate increase. (**Section 4.17**)

Soils

- The project may increase soil erosion. (**Section 4.5**)
- Air emissions deposition from the project may pollute the soil. (**Sections 4.5 and 4.6**)

Special Designations and Sensitive Areas

- The ecological integrity, scenic quality, and pristine characteristics of nearby wildernesses, national parks, national forests, national wildlife refuges, wildlife management areas, and areas of critical environmental concern may be negatively affected by the project. (**Section 4.13**)

Special Status Species

- The project may negatively affect the life cycle and habitat of species identified by state or federal agencies as threatened, endangered, or sensitive. (**Sections 4.7 and 4.8**)

Transportation

- The project may create hazardous driving conditions for local and interstate drivers. (**Section 4.20**)
- Increased traffic increases wear and tear on roads which may need more maintenance, upgrades, and improvements. (**Section 4.20**)
- The railroad may be a hazard to livestock and wildlife. (**Sections 4.8, 4.9, and 4.20**)
- The project could create hazardous conditions for local air traffic. (**Section 4.20**)

Vegetation

- Surface disturbance, air pollution, and water use from the project may negatively affect wetland, riparian, and upland vegetation communities. (**Section 4.7**)
- Surface disturbance and ongoing operation and maintenance activities would increase the spread of exotic plants. (**Section 4.7**)

Visual and Aesthetic Resources

- The scenic quality of Steptoe Valley may be negatively impacted by the project and the pollution it creates. It may impact views within the valley or into the valley from sensitive sites (e.g., Duck Creek Basin, wilderness areas, Great Basin National Park). (**Section 4.15**)
- The project may contribute to light pollution and the degradation of dark skies. (**Section 4.15**)

Water Resources

- The project may negatively impact water quality. (**Section 4.2**)
- The quantity of water used by the project may negatively impact the availability of water to surrounding communities and the environment. (**Section 4.2**)
- The drawdown of groundwater could affect playas and seasonally wet basins, which could dry up and release salt and metal laden fugitive dust. (**Section 4.2**)
- Wastewater discharged from the project could affect surface water quality. (**Section 4.2**)

Wild Horses and Burros

- The project may negatively affect Wild Horse/Burro populations. (**Section 4.9**)

Wildlife Resources

- The construction and operation of the project may directly or indirectly impact wildlife through direct disturbance, habitat fragmentation or air pollution. (**Section 4.8**)
- Water use from the project may negatively affect ground and surface water flows and potentially affect species dependent on springs, seeps, wetlands, or riparian habitat. (**Section 4.8**)
- The construction and operation of the project may impact game species and wildlife populations and indirectly affect hunting, fishing, and wildlife watching activities. (**Section 4.8**)
- The construction and operation of the project may impact migratory birds. (**Section 4.8**)

Chapter 2
Proposed Action and Alternatives

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Chapter 2
Proposed Action and Alternatives

2.1 Introduction

This chapter of the EIS fully describes: (1) the Proposed Action Alternative to build up to a 2,500 MW coal-fueled power plant at the South Steptoe location and associated facilities, (2) an Action Alternative to build these facilities at an alternative site location, and (3) the No Action Alternative. As part of each action alternative various components are described as alternatives for infrastructure locations associated with the transmission lines, water sources, and rail line.

Alternatives considered in the EIS are based on issues identified by the BLM and cooperating agencies as well as comments received during the public scoping process. The agency is required to consider in detail a range of alternatives that are considered "reasonable," usually defined as alternatives that are realistic (not speculative), technologically and economically feasible, and that respond to the purpose of and need for the project.

This chapter includes the following:

- **Section 2.2** provides a detailed description of the Proposed Action and the various component alternatives.
- **Section 2.3** provides a discussion of the Action Alternative at an alternative site location together with the various component alternatives associated with the site.
- **Section 2.4** discusses the No Action Alternative and assumes there would be no development of the Proposed Action or Action Alternative and it also serves as the baseline for environmental conditions.
- **Section 2.5** provides descriptions of alternatives that were considered but eliminated from detailed analysis.
- **Section 2.6** then summarizes and compares the analyzed alternatives.
- **Section 2.7** provides a summary of the mitigation and monitoring for the action alternatives.
- **Section 2.8** presents the Agency Preferred Alternative.

2.1.1 Siting Studies

The Proposed Action and Action Alternatives carried forward for detailed analysis in this EIS were formulated from two preliminary studies by the Proponents, siting and technical criteria, agency input, and public scoping comments.

- In 2003, Nevada Power Company selected Lockwood Greene Engineers, Inc. to perform a site screening study to identify potential power plant sites and transmission arrangements that could support the Proponents' growing power needs for its customer base.

The siting study reviewed sites within the Southwest that could support southern Nevada power needs but gradually narrowed the focus to five potential sites in Nevada and Utah. Ultimately, the study identified White Pine County, Nevada as the preferred location for new coal-fueled power development. A number of potential power plant sites were evaluated, eventually leading

to selection of a site in northern Steptoe Valley as a good location for a coal-fired power plant. The Proponents reviewed the siting recommendations and, based on concerns for safe access and commuting experienced with other remote generation stations, introduced a plant site further south in the valley to be closer to the infrastructure and services offered by the communities of Ely and McGill. More details on the Lockwood Greene siting evaluation are included in **Section 2.5.2**.

In 2006, the Proponents determined to move forward with further analysis of the two sites in Steptoe Valley and one site in Butte Valley and contracted Burns & McDonnell to develop a Constraint Study. The focus of the Constraint Study was to identify the critical issues associated with each site that would affect the development and construction of a new baseload generating facility.

The Constraint Study identified the Butte Valley site as the least favorable site due primarily to a potentially active fault zone crossing the middle of the site. In addition, factors related to its remote location, particularly the need to site a new railroad ROW the length of Butte Valley, the lack of suitable roads into the valley to safely support construction and operations activity, and the remoteness from existing community infrastructure contributed to this site being eliminated from further analysis. The study identified the two Steptoe Valley sites, north and south, as the best candidate sites. Ultimately, the South Plant Site was selected as the Proposed Action site because it had suitable physical characteristics and good proximity to critical infrastructure. The North Plant Site was proposed as a feasible alternative to the Proposed Action. More details on the Constraint Study are included in **Section 2.5.2**.

The two sites in the Steptoe Valley were presented during public scoping meetings and comments were received suggesting additional plant site alternatives that should be considered in the EIS. Several characteristics of recommended alternatives were incorporated into the Proposed Action and Alternatives that are analyzed in this EIS and are described in **Sections 2.2** and **2.3**. Other recommended alternatives were considered and eventually eliminated from more detailed analysis, as described in **Section 2.5** of this EIS.

2.1.2 Description of BLM Actions

2.1.2.1 Issuance of ROWs

After the Record of Decision is signed, BLM would issue ROWs necessary for construction and operation of the Plant Site and associated facilities. ROWs issued for 30 years with the option of renewal would be necessary for the operation and maintenance of all EEC facilities located on BLM-managed public land. In addition, short-term ROWs would be required from the BLM to accommodate construction activities such as drilling, trenching, paving, and material/equipment staging. ROWs would be issued for:

- Plant ROW - Approximately 3,000 acres of land (**Section 2.2.1.1**) for construction and operation of associated plant elements including the electric switchyard.
- Electric Transmission Facilities ROW - Construction and operation of electric transmission lines and associated facilities to interconnect the power plant with existing and planned transmission facilities including switchyards, substations, transmission lines, access roads, and the Mount Wheeler Power Inc.'s (Mt. Wheeler) transmission lines needed to provide an adequate power supply for power plant construction activities, the worker village, and well fields.

- Water Supply Facilities ROW - Construction and operation of the water supply system to provide water for the power plant including ground water wells, storage reservoirs, underground water pipelines, electric distribution lines, communication lines, and access roads.
- Rail Lead ROW - Construction and operation of a rail lead (rail interconnection from the railroad to the plant site) from the existing Nevada Northern Railway (NNRy) to the power plant for the supply of coal, commodities and potential by-products, and includes access roads.
- Alternative Rail ROW - Construction and operation of an alternative rail line from the power plant to Shafter, Nevada for the transportation of coal, bulk commodities and potential by-products, and includes access roads, if the NNRy were not available for this use.

2.1.2.2 Disposal through direct sale of Plant Site ROW

Under BLM regulations and guidance, federal land identified for disposal in the applicable BLM Resource Management Plan may be sold by competitive bid, modified competitive bid, or direct sale. In all cases, the BLM must obtain no less than fair market value for the land it sells.

The Proponents have requested that under FLPMA the BLM dispose of up to 2,500 acres identified as the plant site to include the landfill area and the other plant infrastructure through direct sale. The remaining 500 acres would remain under BLM ROW grant authorization.

2.1.2.3 Mineral Materials Sale

Off-site borrow areas may be established on private lands or from existing authorized sites on BLM managed public lands to supply earth and rock materials for project construction and limestone for operation of the power plant air quality control equipment.

2.1.3 Water Use and Air Pollution Control Technology Evaluation

This section describes the major factors that determined the water and air quality technologies selected for the Proposed Action and how they relate to water consumption and air emissions. The Proponents established three conceptual design principles to help guide the evaluation process:

- Generate electricity at the highest efficiency and reliability.
- Reduce water consumption.
- Utilize the most reliable and advanced air quality control systems available.

These principles have negative direct correlations. Water cooling uses more water, but it enhances plant efficiency. Dry cooling uses less water, but it reduces plant efficiency. Wet scrubbing uses more water, but it reduces emissions. Dry scrubbing uses less water, but it results in higher emissions.

2.1.3.1 Relationship Between Water Use and Air Pollution Control Technologies

Two technologies were considered which would control the air emissions to levels that meet air permit requirements; the wet and dry flue gas desulfurization (wet and dry FGD) processes.

The dry FGD system consumes less water (roughly 1/3 less), has a lower capital cost, and results in higher generation efficiency than a wet FGD system. However, there is a trade-off with respect to air emissions between the wet FGD and the dry FGD that required an evaluation of impact. A comparison of sulfur dioxide emissions for the two technologies using a typical low-

sulfur coal is listed in **Table 2.1-1** below and demonstrates the substantial reduction in emissions utilizing the wet FGD.

TABLE 2.1-1. COMPARISON OF SO_2 EMISSIONS USING DRY AND WET FGD TECHNOLOGIES

	DRY FGD	WET FGD
SO_2 emissions (lb/MMBtu)	0.09	0.06
SO_2 emissions (tons/year)	6,867	4,578
SO_2 emissions difference	2,289 tons/year	
Total Percent difference	33% annual reduction using wet FGD	

The selection of air quality control equipment must primarily take into account the goal of the equipment, which is to reduce air emissions. An air emissions Best Available Control Technology (BACT) analysis was prepared as part of the PSD permit application (Tetra Tech 2007), and although the results indicated that the dry FGD process was an acceptable selection over wet FGD based on cost and heat rate efficiency (heat rate as used here is a measure of overall power plant efficiency where a lower heat rate is equivalent to higher efficiency), the Proponents made the decision to install wet FGD in order to achieve the lowest possible SO_2 emissions. The Wet FGD technology was also strongly recommended by the Federal Land Managers to minimize regional airshed effects of the plant.

2.1.3.2 Heat Dissipation

Coal-fired power plants use high pressure (superheated) steam to turn the turbines for the generation of electricity. Upon exiting the turbine, the steam has lost pressure, and must be condensed back to the liquid state to be reheated back to high pressure steam. Large quantities of low grade heat are given off by the condensing of steam and also from equipment cooling needs. The EEC must dissipate this heat to the air since it is not located next to a body of water such as a river or lake.

Historically, there have been two primary means of dissipating heat to the air. The first is by directly increasing the dry air temperature using an Air Cooled Condenser (ACC), and the second is by using the sensible heat of evaporation of water in a wet cooling tower (Wet Tower). In recent years, a hybrid of these two concepts has become commercially available that uses both wet and dry cooling, allowing power plant designers to balance the strengths and weaknesses of the two concepts. Hybrid cooling allows for economical operation of the plant using both wet and dry systems during periods of higher ambient air temperatures, while conserving water during periods of lower ambient air temperatures by reducing the wet cooling portion of the system and relying more on the ACC for cooling needs.

In selecting the cooling system for the EEC, the emphasis was placed on plant heat rate and overall cycle economics. As stated above, the lower the plant heat rate, the more efficient the power plant. This higher efficiency also corresponds to fewer overall plant air emissions and lower coal consumption. Using a base case of hybrid cooling as previously described, a comparison of the plant heat rates along with water use, capital cost, and flue gas flow are provided in **Table 2.1-2**. These factors were assigned costs and entered into a net present value calculation. The results of this calculation showed that the hybrid heat rejection system was the preferred selection. The Heller cycle is another type of dry cooling system which was initially considered for the plant, but later rejected due to its high evaluated cost and the concern that it was unproven technology for operation at a high altitude such as the Steptoe Valley. It is

also shown in the table below for comparison purposes. The higher flue gas flow reflected in the ACC and Heller options is significant because it is reflective of a higher volume of emissions.

TABLE 2.1-2. COMPARISON OF DRY COOLING SYSTEMS TO A HYBRID SYSTEM BASE

Comparison Criteria	Hybrid	ACC	Heller
Water Use (Ac-ft/yr)	Base	-4872	-4872
Net Heat Rate (Btu/kWh)	Base	+201	+152
Capital Cost ($)	Base	+47,000,000	+80,000,000
Flue Gas Flow (lb/hr)	Base	+423,000	+368,000

2.1.3.3 Water Reuse and Recycling

The amount of reuse and recycling of water at a power plant is often driven by economics. Simply put, at most power plant sites it is cheaper to dispose of used water off-site than to recycle it. For power plants for which a decision has been made not to dispose of water off-site and thereby become a zero liquid discharge facility, the recycling of water becomes more economically justified.

The costs associated with water disposal at zero discharge facilities drive system designs to efficiently recycle water and to minimize the amount of water being consumed. The recycling and reuse of water was incorporated into the design of the EEC (**Sections 2.2** and **2.3**). When the wet cooling tower of the hybrid system is in operation, the wet cooling tower blowdown would be sent to the wet FGD system and the water reused. During months that the cooling tower is not in operation, makeup to the wet FGD system would be primarily from the raw water pond.

2.1.3.4 Air Quality Pollution Control Equipment

The EEC is considered to be a "major source" under Federal Prevention of Significant Deterioration (PSD) regulations for protecting air quality. For a new major source subject to PSD review, all pollutants for which the area is classified as "attainment" and that are emitted at amounts equal to or greater than "significant emission rates" set by the EPA are subject to a Best Available Control Technology (BACT) analysis. The projected emissions of nitrogen oxides (NOx), sulfur dioxide (SO_2), sulfuric acid (H_2SO_4), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM), lead, and hydrogen fluoride (HF) from the EEC exceed the significant emission rates set by the EPA and are subject to a BACT analysis (Tetra Tech 2007).

Top-Down BACT Process

The BACT process is discussed in detail in the EPA document "New Source Review Workshop Manual: Prevention of Significant Deterioration and Non-Attainment Area Permitting" (NSR Manual) (EPA 1990). The BACT process is conducted by pollutant for each emission source and contains the following five steps:

1. Identify all potential control technologies applicable to the pollutant and process.
2. Determine the technical feasibility of each control technology identified under Step 1 as applicable to the proposed facility.
3. Rank the remaining control technologies based on achievable emission rates.

4. Evaluate the most effective control technology based on economic, energy, and environmental factors. If the most effective control technology is not feasible as a result of economic, energy, or environmental factors, the next most effective technology is evaluated. This process continues until a technology is selected. If the top ranked technology is chosen as the BACT, it is not necessary to review the economic, environmental, and energy factors.
5. Select a BACT and corresponding emission limit for the pollutant.

Potential control technologies were identified for the EEC under Step 1 by reviewing the "RACT/BACT/LAER Clearinghouse (RBLC)" database (EPA 2006a), the EPA "National Coal Database: National Coal Fired Utility Projects Spreadsheet" (EPA 2006b), recent permit applications, technical papers, and literature from and discussions with control technology vendors. The pollution control technologies considered for the EEC were evaluated for technical feasibility; ranked by achievable emission rate; and evaluated for economic, energy, and environmental factors. BACT and emissions limits were then identified for each pollutant (Tetra Tech 2007).

Proposed BACT Controls and Emission Rate Limitations

For the main pulverized coal-fired (PC) boilers, the Proponents chose the BACT to be selective catalytic reduction (SCR) with low NOx burners (LNB) and over fire air (OFA) for NOx control; wet FGD for SO_2 control; pulse jet fabric filter system for PM and lead control; wet FGD for HF and H_2SO_4 control; powdered activated carbon (PAC) for mercury control, dry sorbent injection (DSI) for acid gas emissions; and good combustion practices for CO and VOC control. The EEC and Bureau of Air Pollution Control have chosen the most stringent possible emissions limits from the top-down analysis as BACT. **Table 2.1-3** summarizes the proposed BACT controls and emission rates.

TABLE 2.1-3. SUMMARY OF SELECTED BACTS FOR EMISSION SOURCES

PROCESS	POLLUTANT	PROPOSED EMISSION LIMIT (LB/MMBTU)	CONTROL TECHNOLOGY
PC Boilers	NOx	0.06 (24-hr Average)	LNB, OFA, and SCR
	SO2	0.06 (24-hr Average)	Wet scrubber
	H_2SO_4	0.004	Wet scrubber – Fabric filter
	CO	0.1	Combustion controls
	VOC	0.003	Combustion controls
	PM/PM10	0.01 (Filterable PM10, 24-hr Average) 0.02 (Filterable and Condensable PM10, 24-hr Average) (Opacity = 10%)	Fabric filter
	Lead	2.59E-05	Fabric filter
	HF	0.0004	Wet scrubber – Fabric filter

2.1.3.5 Summary of Water Use and Air Pollution Control Technology Evaluation

In addition to the selected BACTs in **Table 2.1-3**, the following decisions were made and used in developing the Proposed Action and action alternatives:

- Limit total raw water usage to 8,000 acre-feet per year (AFY) for Phase 1. There are 25,000 AFY of water rights in Steptoe Valley that are permitted and held by White Pine County for power generation. These water rights were contracted to White Pine Energy Associates for their Proposed Action and alternative power plant sites in Steptoe Valley. As the WPEA's plans become more definitive, some of these water rights and permitted points of diversion will not be used by them and would be available to others, potentially including the Proponents. The Proponents have also been purchasing privately held land and water rights in Steptoe Valley to provide adequate groundwater supplies for water usage at the EEC, subject to approval of change in use and points of diversion as necessary by the Nevada State Engineer.
- Use wet FGD technology for sulfur control. Although it uses approximately 1,000 more AFY of water than dry FGD, sulfur emissions would be reduced by approximately 30 percent compared to dry FGD.
- Employ a hybrid cooling cycle that primarily uses an air-cooled condensing system, but is supplemented with traditional wet cooling towers. This combination system uses approximately 50 percent less water than traditional cooling tower systems, but it uses more water than a system that only uses an air-cooled condensing cycle. The wet cooling would enhance plant efficiency. Other alternative hybrid cooling systems that supposedly use less water (i.e., Heller system) were evaluated, but rejected by the Proponents because they have not been proven at comparable altitudes. There was additional concern about the visual impact of a Heller 500-foot tall parabolic cooling tower and its related efficiency impact.

2.1.3.6 Carbon Capture and Sequestration

The temperature of the planet's atmosphere is regulated by a balance of radiation received from the sun and the amount of that radiation absorbed by the earth and atmosphere. Greenhouse gases (GHG, including carbon dioxide and methane), as well as water vapor and particulate matter in the atmosphere keep the planet's temperature warmer than it would be otherwise; allowing the planet to sustain life. While these gases and particles have occurred naturally for millennia, there has been a marked increase in their atmospheric concentration since the start of the industrial age, contributing to observed climatic variability beyond the historic norm.

There is substantial scientific evidence that increased atmospheric concentrations of GHGs as well as land-use changes are contributing to an increase in average global temperature (global warming). This warming is associated with climatic variability that exceeds the historic norm (climate change). Though the average global temperature has increased by 1.8°F from 1890 to 2006, temperature change and climactic variability are not evenly distributed across the globe. Observed temperature increases in northern latitudes have been greater than those in other areas, and seasonal low temperatures are generally increasing faster than high temperatures. Other unevenly distributed effects of climate change include altered weather patterns, sea levels, precipitation rates, wildfire occurrences, seasonal timing, desert distribution, and plant and animal distribution.

Carbon capture and sequestration (CCS) is an approach to capture carbon dioxide (CO_2) from large point sources such as fossil fuel power plants and storing it instead of releasing it into the

atmosphere. For fossil fuel combustion, carbon capture refers to separating CO_2 from the exhaust gas before it is released to the atmosphere. Carbon sequestration is the permanent storage of the captured CO_2 in a manner that will prevent it from later reaching the atmosphere. A variety of technologies have been proposed, but have not yet reached a stage of development where they are available for full-scale commercial application to large pulverized coal fired power plants like the EEC. A preliminary assessment by the Nevada Bureau of Mines and Geology (Price et al. 2005) determined there was a low potential for geologic carbon sequestration in shallow formations in Nevada, oil fields, or saline aquifers; however, the report suggested that there may be some potential for storage in formations below one kilometer or in mined salt formations in southern Nevada. Chemical reaction with mafic or ultramafic rocks, found in Nevada, is another potential avenue for research in Nevada (Price et al. 2005).

From the beginning of the design of the EEC, the Proponents have designed the power plant to be carbon capture ready by arranging the facilities between the boilers and the stack to leave enough open area in the right location for the addition of a future carbon capture system. The flue gas ducting would also be configured and constructed to be able to divert exhaust gas to a future carbon capture system. This area is shown on **Figures 2.2-3 and 2.3-3**. As CCS has not been commercially developed; this design was based on vendor estimates of conceptual designs. The State and the Proponents have entered into a Memorandum of Understanding (MOU) wherein the Proponents have committed to use commercially reasonable efforts to design and construct the EEC, so it would be carbon capture ready (NDEP, NPC, SPPC 2007). The future commercial availability of CCS technologies for application to the EEC would be assessed by the PUCN, who would need to approve the application of the CCS technology for the facility. Upon receiving final approval from the PUCN, the Proponents would install the CCS technologies.

2.2 South Plant Site – Proposed Action

2.2.1 Plant Site

The initial phase at the EEC would be comprised of two 750-MW ultra-supercritical pulverized coal-fueled units designed to be capable of baseload operations 24 hours a day, 365 days per year. Phase 2 would include two additional 500-MW coal gasification units. The units would be designed to predominately burn low sulfur coal from the Wyoming Powder River Basin and other coals of similar quality.

It is planned that the Phase 2 units would utilize integrated gasification combined cycle (IGCC) technology or another clean combustion technology option. The current technology for the IGCC or similar technology of sufficient scale and reliability has not yet been developed to the point where designs can be rendered and analysis can be realistically prepared for environmental impacts related to air emissions, water supply, combustion wastes, and socioeconomic considerations. Therefore, this EIS will only analyze the impacts of the components of Phase 2 that can realistically be evaluated at this time (i.e., the ground disturbances related to the entire power plant site and two 500-kV transmission lines, one for each phase). When definitive plans for Phase 2 of the EEC project are identified, a new air permit and required NEPA analysis would be prepared to evaluate the environmental impacts of that phase before its approval.

The South Plant Site would be located in Steptoe Valley approximately 20 miles north of the city of Ely and 7 miles north of the town of McGill, situated on the west side of US-93.

2.2.1.1 Elements and ROWs

An overview of all the project elements for the Proposed Action is contained in **Figure 2.2-1**. This shows all the project elements in context as they would relate to each other and the surrounding region. **Figure 2.2-2** focuses on the primary project elements that would occur within Steptoe Valley.

Power Plant Facilities

The site layout for the South Plant Site is shown in **Figure 2.2-3**. The total land area needed for the site would be approximately 3,000 acres (comprised of an approximately 2,500-acre tract disposed of through direct sale by BLM and an additional 500-acre ROW), which includes approximately 1,000 acres for the ash and other combustion by-product landfill. The site layout shown includes two 750 MW ultra-supercritical pulverized coal-fueled units for Phase 1. The plant layout shows the relative location of all major equipment and systems required for operation of the ultra-supercritical pulverized coal-fueled units on the 3,000-acre site. Facilities on the site would include:

- Administration building, parking lot, perimeter fence
- Maintenance shops, warehouses
- Fuel oil, lube oil, and chemical storage tanks
- Rail lead, on-site rail loop (approximately 1.5 miles long)
- Coal train unloading, storage, conveying, and crushing with dust controls (crusher house and coal storage domes 120 feet high)
- Lined raw water storage, stormwater evaporation retention basins and wastewater evaporation ponds
- Water treatment facilities and treated water tanks
- Ultra-supercritical boilers (280 feet high)
- Steam turbine generators and associated systems (120 feet high)
- Single exhaust stack (700 feet high)
- Air cooled condensers (120 feet high)
- Wet-type cooling towers
- Diesel emergency generators and fire-water pumps
- Air quality control systems (see below)
- Electrical switchyard and main transformers
- Combustion waste handling facilities with dust controls
- Combustion by-product landfill
- On-site monitoring tower

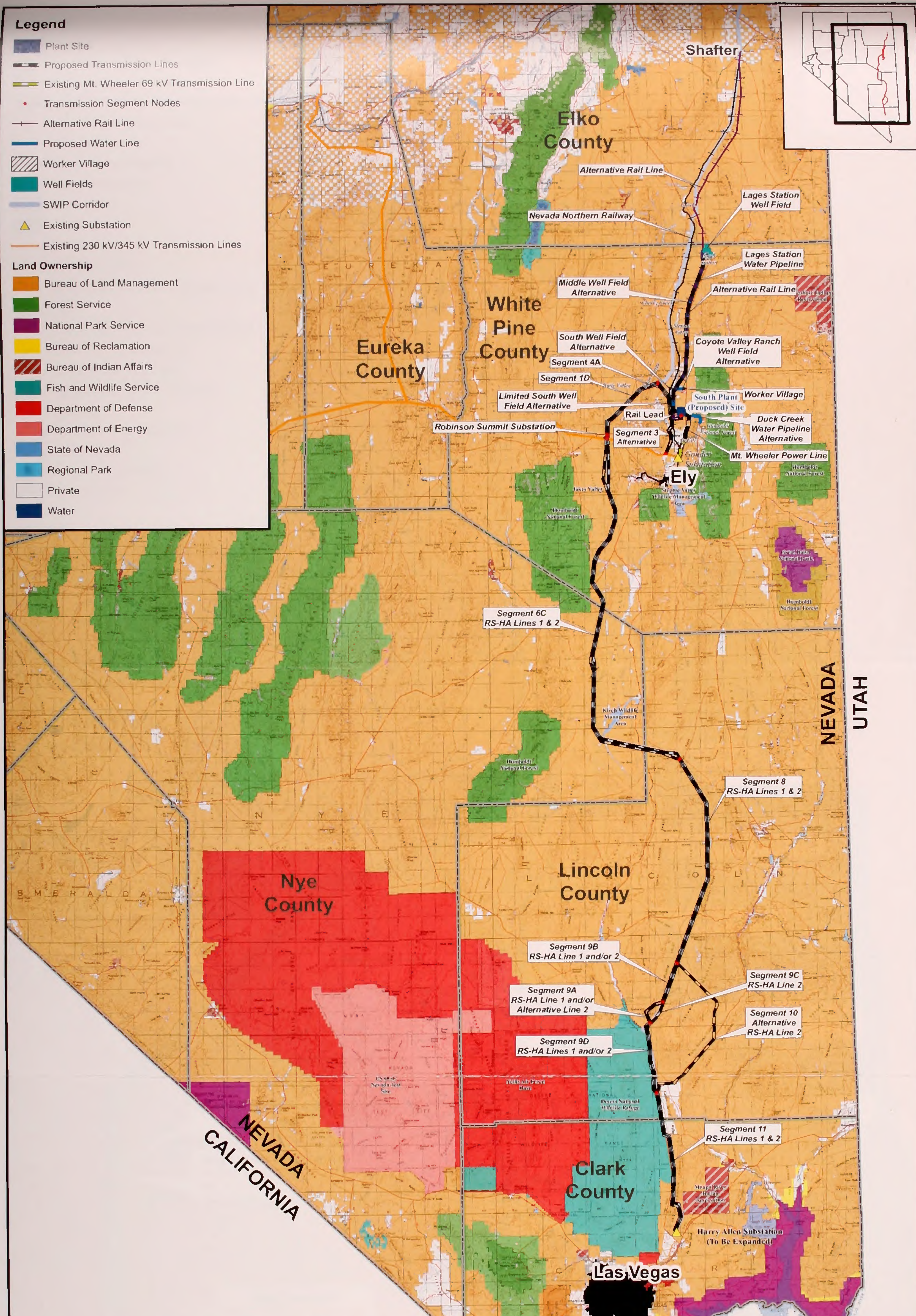
Handling and burning coal fuel can generate potential air pollutants. Air emissions from the plant operations would be controlled with a variety of proven technologies and equipment. Air quality control systems would include:

- Chemical, water suppression, compaction, or contouring on inactive storage coal piles, domes over coal active storage piles and, enclosures and dust collection systems at coal transfer points.
- Closed systems with dust collectors for handling dry fly ash and moisture enhancement of fly ash before hauling and disposal at the combustion by-product landfill.
- High efficiency ultra-supercritical boilers to reduce carbon dioxide (CO_2), carbon monoxide (CO) and volatile organic compound (VOC) emissions.
- Low nitrogen oxide burners, overfire air and selective catalytic reduction (SCR) to control nitrogen oxide (NO_x) emissions.
- Accommodation for future CO_2 capture technology.
- High efficiency fabric filters to control flue gas particulate emissions.
- Low sulfur coal fuel and wet flue gas desulfurization (FGD) with limestone/water to control sulfur dioxide (SO_2) emissions.
- Wet FGD to control acid gas emissions.
- Dry Sorbent Injection (DSI) to control acid gas emissions.
- Powdered Activated Carbon (PAC) to control mercury emissions.
- Pulse-jet fabric filter (baghouse) to control particulate emissions, mercury and acid gas emissions.

The site plan shown in **Figure 2.2-3** includes space for potential future CO_2 capture and arrangement for a potential 1,000 MW coal gasification technology option for plant expansion as part of Phase 2.

In the power plant, water would be heated in a boiler to make high pressure and temperature steam that would be used to turn a turbine/generator to produce electricity. After expanding through the turbine, the steam would be condensed and this condensate water would be recycled back to the boiler for reuse. The EEC would employ a combination of the air-cooled and cooling tower systems, referred to as a hybrid cooling system, which would reduce the requirement for cooling water compared to a conventional wet-cooled power plant. The air-cooled condensers would operate during the entire year and require no additional water to condense the steam. To maintain plant efficiency during warmer months of the year, supplemental cooling would be provided with a cooling tower that would use evaporative cooling. Another large water requirement of the EEC would be water used in the wet FGD air quality control system. Wet FGD is an effective means for control of sulfur dioxide and other pollutant gases and vapors in the flue gas and employs a circulating mixture of water and ground limestone to react with the pollutants in the hot flue gas before it is discharged to the stack. The contact of the water in this system with the flue gas would result in evaporation of water that would be discharged from the stack.

The above water uses are the major areas of water consumption for the power plant. Smaller volumes of water would be consumed on-site for other purposes. On an annual average basis



Source - Land Ownership: Bureau of Land Management
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno)

1:1,500,000

10 0 50 Miles

10,000 0 70,000 Meters

Scale is 1:1,500,000 when printed at 11"x17"

N

FIGURE 2.2-1
PROPOSED ACTION: PROJECT ELEMENTS
ELY ENERGY CENTER

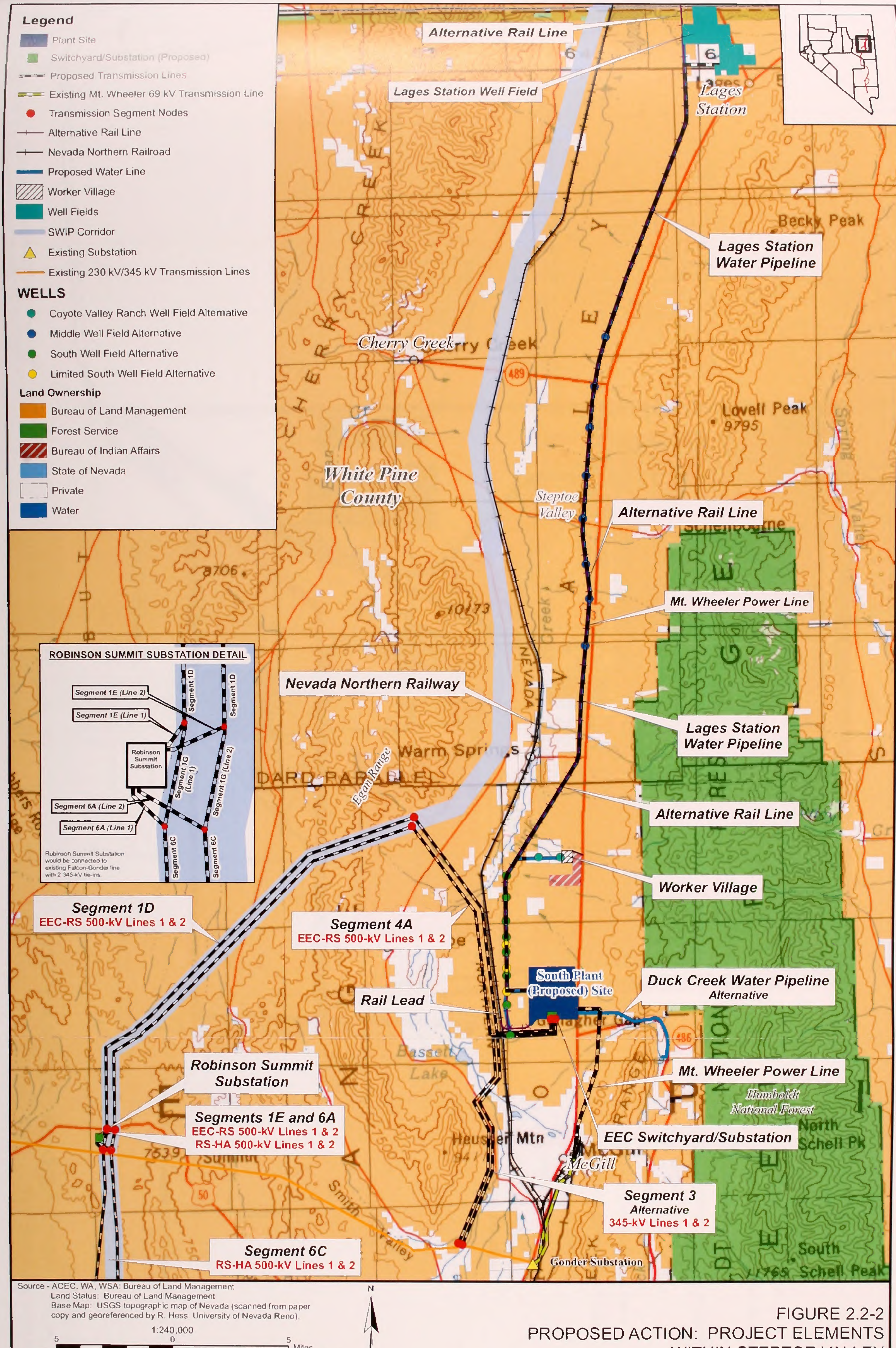


FIGURE 2.2-2
PROPOSED ACTION: PROJECT ELEMENTS WITHIN STEPTOE VALLEY
ELY ENERGY CENTER

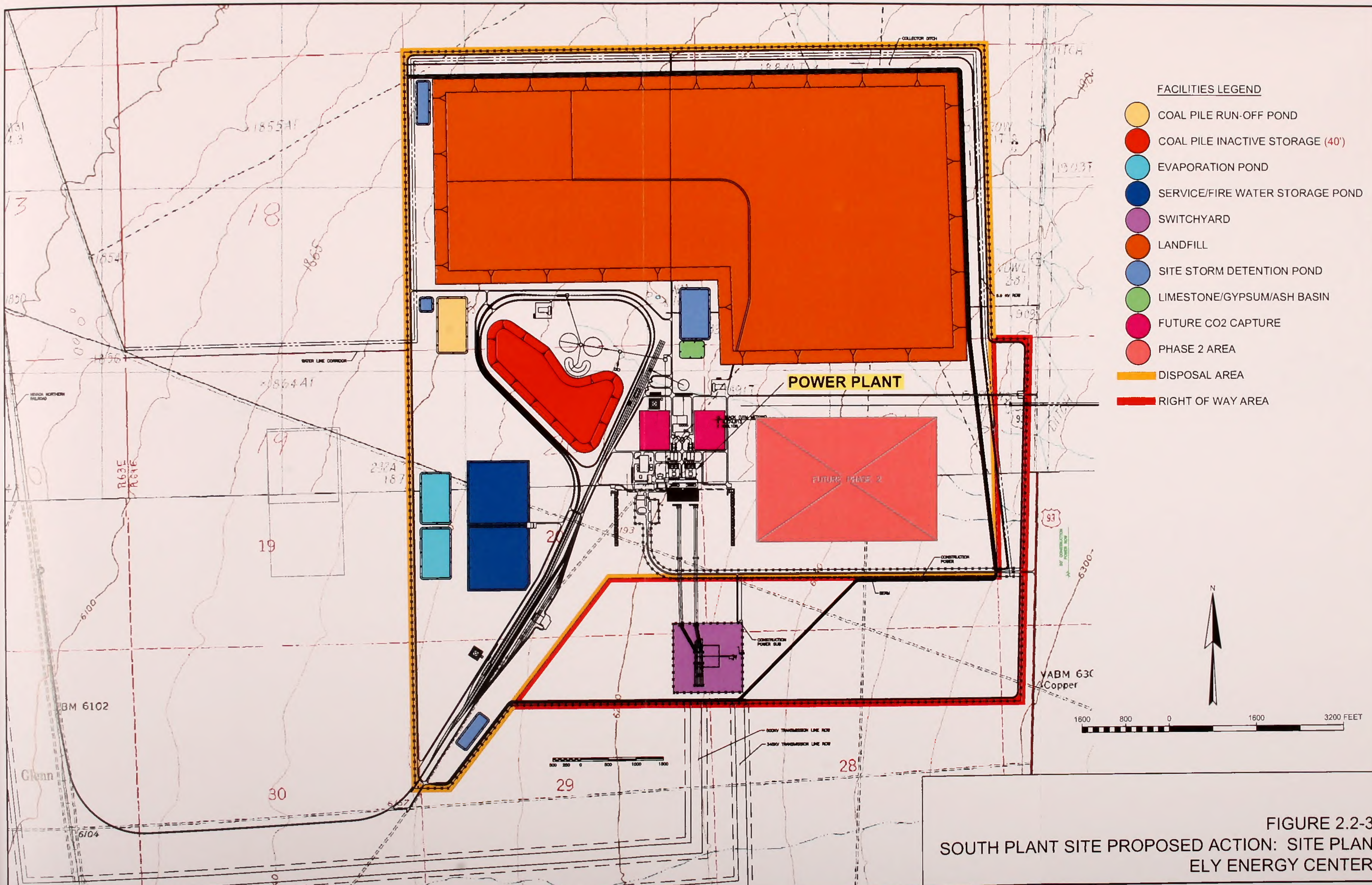


FIGURE 2.2-3
SOUTH PLANT SITE PROPOSED ACTION: SITE PLAN
ELY ENERGY CENTER

with the wet cooling towers of the hybrid cooling in operation during the summer months, the water consumption based on preliminary designs is estimated as follows:

- Cooling towers: 3,524 gpm
- FGD system: 1,031 gpm
- Boiler replacement water: 327 gpm
- Misc. plant uses: 100 gpm
- Raw water treatment losses: 14 gpm

To the extent possible, water used in one system in the plant would be recycled for use elsewhere before being disposed. The EEC would use a dry bottom ash conveyance system; therefore, there would be no bottom ash transport water consumption except water added for dust control prior to hauling to landfill. Dust control would use reclaimed water from the wastewater treatment plant. The description of the proposed water supply and alternatives is included in **Section 2.2.3**.

Coal Unloading, Storage, and Handling

Phase 1 of the power plant would use approximately 912 tons of coal per hour when the plant is at full load operation. One or more coal unit trains would arrive and be unloaded at any time on a daily basis. A rail lead would connect the plant site with the rail line in Steptoe Valley. The on-site coal handling facilities would include a rail loop, track sidings, unloading equipment, inactive storage and reclaim, active storage reclaim, crushers, fuel sampling, and conveyors for delivery of coal to the power plant. Rail car unloading would be by rotary dump. Inactive storage would be on an open pile and active storage would be in storage domes. Coal dust would be controlled at all dumping and transfer points and active storage piles with enclosures and dust collection systems. Dust from exposed coal on the inactive storage pile would be controlled with water, compaction, contouring, or chemical stabilization measures. Stormwater runoff from the coal handling area would be retained on-site in an evaporation retention basin.

Combustion By-products and Wastewater Handling

Fly ash and bottom ash would be by-products produced in the boilers during the coal combustion. Fly ash would be removed from the flue gas in emission control baghouses and bottom ash would be collected at the bottom of the boilers. These would be collected in a dry condition and conveyed to bins and silos for loading into trucks. Water would be added as necessary to the ash material for dust control before being loaded into trucks for hauling to the on-site combustion by-product landfill for disposal. Additional water would be added as necessary at the landfill by water trucks for dust control and compaction of the ash. The compacted ash would solidify to a solid with low water permeability in the landfill.

Another combustion by-product is FGD precipitate consisting of a calcium sulfate (gypsum) solid produced in the wet FGD system, which would contain the sulfur scrubbed from the flue gas. This slurry of solid particles and water would be dewatered to about 10 percent moisture content and also hauled to the on-site combustion by-product landfill for disposal.

The on-site Class III combustion by-product solid waste landfill would accommodate Phase 1 and Phase 2 of the project and be constructed with a perimeter dike and a geosynthetic liner in accordance with Nevada Division of Environmental Protection regulations. The landfill liner and dike would route water falling on the landfill to an on-site, lined collection evaporation retention basin and prevent discharge of landfill runoff or leachate to surface water and groundwater. The landfill would be constructed gradually over time with separate sections to reduce the area of

active landfill operations at any one time. Completed landfill sections would be regraded, covered with earth, and revegetated. The landfill would be sited on approximately 1,000 acres within the overall plant site. It would be located within the approximately 2,500 acres requested to be disposed by BLM. The multiple cells that would comprise the landfill would have crowns of varying heights ranging up to 80 feet. The landfill would have a projected 50 year volume of 89 million cubic yards. The on-site landfill would be used for combustion by-products and process solid wastes. Other materials such as construction waste, estimated to be 76,600 cubic yards through the construction phases, and 780 cubic yards per year afterwards, including trash, garbage, scrap, maintenance wastes, and chemical wastes would be transported off-site to approved facilities for disposal or recycling. These quantities have been discussed with the Ely Municipal Utility Board and a plan to manage these wastes would be developed cooperatively with the Board.

There is the possibility that some combustion by-products could be sold and transported off site instead of being disposed of in the on-site landfill. Fly ash is used as an additive in concrete and soil amendment applications due to its pozzolanic (silica mineral binding) properties. Fly ash and bottom ash can be used for structural fill in civil engineering projects. Off-site use of fly ash and bottom ash from the EEC would be pursued by the Proponents in concert with market demands and the economics of transporting the materials from the plant site.

Wastewater produced at the plant in various processes would be recycled internally to the extent feasible and the remaining, unusable wastewater would be disposed of on-site with no off-site discharge. Evaporation ponds designed for process wastewater and plant storm water runoff would be constructed within the overall plant site. In addition, other lined evaporation basins would collect runoff from the coal pile, limestone/gypsum/ash area and combustion by-products landfill areas and would also be constructed within the overall plant site. These would allow the plant to operate as a zero wastewater discharge facility. Evaporation basins for process wastewater and contact stormwater would include environmental protection measures required by the Nevada Division of Environmental Protection. A leak detection system, additional liner protection at the discharge point for the inlet piping, textured liner escape ramps, berms to ensure stability during operation, and environmental monitoring may be required. In addition, the Construction and Operations Maintenance Plan (COM Plan) would identify specific protection measures that would be implemented to minimize the potential for water quality related impacts to wildlife (see **Appendix 2A, Best Management Practices**). Treated effluent would be disposed of in an on-site drain field.

EEC Switchyard/Substation

500-kV Switchyard

A 500-kV switchyard would be constructed on the EEC plant site, the dimensions for which would be about 1,200 by 1,200 feet (33 acres). The purpose of this switchyard would be to transfer the electricity generated by the power plant to the electric transmission system. The site for this new switchyard would be included within the ROW for the plant site. Two 500-kV transmission lines would lead from this switchyard to the SWIP Corridor about 13 miles away (**Figure 2.2-2**).

500/345-kV Substation Alternative

If the Robinson Summit Substation were not constructed (see **Section 2.2.2.1**), the EEC switchyard would be expanded to accommodate the addition of 500/345-kV equipment that otherwise would have been installed at the Robinson Summit Substation. The expanded substation would still fit within the overall plant site. This would also facilitate the connection to

the Falcon to Gonder 345-kV line that would otherwise have been accomplished at the Robinson Summit Substation.

Construction Worker Village

The Proponents plan to construct a Worker Village on approximately 150 acres of private land, 5 miles north of the South Plant Site (shown on **Figures 2.2-1 and 2.2-2**). Additional details are provided in the *Workforce and Equipment Requirements* section below.

Mt. Wheeler Power Lines

In conjunction with the construction of the power plant, Mt. Wheeler Power Company is planning to upgrade existing transmission lines and construct a new 69-kV transmission line to provide an adequate supply of reliable power for power plant construction activities, the worker village, and the well fields. The following activities are being proposed as ROWs to be granted by BLM, and are shown on **Figures 2.2-1 and 2.2-2**:

- Install new 230/69 kV transformer at Gonder Substation (within existing footprint) and several new poles outside of the Gonder Substation footprint to accommodate feeder positions inside the substation.
- Rebuild/Upgrade (reconductor) existing 69 kV lines (approximately 10 miles for one line and 5 miles for another line). Upgrade activities would include installing new wooden poles between existing poles and replacing existing conductor wires with larger conductor wires capable of handling a larger capacity power load. Some new construction access roads would be needed and all construction activities related to upgrading the existing lines would be conducted within the existing 40-foot right-of-way (ROW) for each line.
- Construct a new Switching Substation (approximately 200' X 200') approximately 1 mile north of Duck Creek Road (County Road 486) and one mile east of the EEC South Plant Site.
- Install new 69 kV lines to the Switching Substation (approximately 2 miles for one line and 6.5 miles for another line) in between the Gonder Substation and the proposed new Switching Substation. Both of these new lines would parallel existing lines. Construction activities would include installing new single wooden poles. Poles heights would average 65 feet and average span width would measure 300 feet. Some new construction access roads would be needed within the proposed ROWs and could remain as future access roads along the newly constructed power lines. New 40-foot wide ROWs would be required for these new line segments.
- Install 2 new 69 kV lines from the Switching Substation to the eastern boundary of the EEC South Plant Site. Two new 40-foot wide ROWs would be required for these segments.
- Install a new 69 kV line from the South Plant Site to the Lages Station well field, approximately 35 miles. The new power line would be built within the alignment identified for the water line and the alternative rail line and would provide power for the selected EEC worker village, the selected water well field, and the North Plant Site if selected.
- Remove existing 69 kV line from south of McGill Townsite, along the western edge of McGill, to north of McGill where it intercepts the new line. Removal activities would only take place after all rebuilt and new lines are energized.

2.2.1.2 Construction Activities

Construction of Phase 1 of the South Plant Site would take approximately 60 months to complete. Construction activities and facilities for the plant site would generally include engineering surveys; construction mobilization; construction surveying and staking of building locations; site grading; installation of foundations and underground utilities; erection of building structures; fabrication, assembly and erection of major equipment including boilers, steam turbine generators, feedwater heaters, transformers, stack and air quality control systems; installation of auxiliary equipment such as pumps, fans, emission controls, and water treatment; assembly and installation of commodities including conduit, raceways, cable, pipe, valves, and appurtenances; construction of water storage ponds, evaporation basins and ash disposal landfills; construction of a rail lead and coal, limestone and other bulk commodities handling facilities; testing and commissioning; and cleanup and site reclamation. A proposed site layout is shown in **Figure 2.2-3**.

Site Preparation and Mobilization

Upon approval of this ROW Grant and after BLM issues a notice to proceed (NTP), preconstruction surveying and soil testing activities would take place on the site. These surveys would locate the construction boundaries, spot the major structures on the site, and test the soil at numerous locations.

Surveys would stake site boundaries, road and utility alignments, foundation locations, etc. Pre-mobilization activities would include obtaining permits, securing the labor force (see *Workforce and Equipment Requirements* section below), and ordering materials and the necessary equipment to accomplish the construction of the facility.

Construction mobilization activities on the site include contractors obtaining permits, hiring and mobilizing labor forces, and staging the necessary equipment to accomplish the construction of the Power Plant. Also during mobilization, any material storage yards, construction yards, and concrete batch plant locations would be located and established inside the plant boundaries.

<u>Construction Utilities</u>

Temporary utilities to be used during the construction phase would be installed, and provisions made for power, communications, water, waste and sanitary facilities. Construction utilities planned include:

- Electric Power – A reliable source of power would be needed to support construction activities and as described above, Mt. Wheeler would supply the required power through a combination of upgrading existing transmission lines and building new transmission lines. Prior to the availability of the Mt. Wheeler transmission lines, onsite construction power would be provided by diesel-powered generators.
- Water – A well would be drilled on-site for construction needs. This well would be pumped at an average rate of about 175 gpm for the construction period and thereafter would provide potable water for the plant at an average pumping rate of just over 6 gpm.
- Waste and Sanitary – No sewer connections to the power plant site are planned. Sanitary sewage produced during construction would be collected and trucked off site to an approved disposal facility during construction.
- Communications – Land based phone lines would be required along with cell phone, radio, and microwave communications. If needed, fiber optic communications cables to

the plant would be installed on the Mt. Wheeler 69-kV line or extended from the buried fiber optic cables within the 69-kV ROW.

Borrow Area

Mineral materials would be used throughout the construction process. It is anticipated that all of the required borrow materials for general grading would be obtained from the plant site itself. Select aggregate material for use in concrete and paving would be obtained through purchases on the open market from existing private sources. These materials would then be transported to the construction site.

Access Roads

Two new asphalt access roads would provide access to the site from U.S. Highway 93 (US-93). The main plant access road would lead generally west from the highway to an administration building at the south end of the plant site area. A separate access road would lead west from the highway to the north end of the plant site area for construction activities. The access roads would be approximately 24 feet wide. Additional width and roadbed strength may be required if equipment modules are to be transported to the site by heavy haul transporter. The intersection of both access roads with US-93 would be designed and constructed in accordance with Nevada Department of Transportation (NDOT) specifications. Turning lanes, shoulder improvements, drainage, and signage would also be provided as specified by NDOT.

The project would require access to all work areas on-site for equipment, personnel, and delivery of material. Permanent plant roads would be constructed to provide needed access. In areas where permanent access roads do not provide adequate access to construction areas, temporary roads would be built. General purpose roads would be approximately 20 feet wide. In some areas, movement of large cranes or heavy equipment transporters would require wider roads with substantial road base to suit the intended use.

A construction road plan would be provided on the structure location drawings submitted with the final site plan.

Clearing and Grading

Power plant construction would require extensive grading to maintain appropriate grades and horizontal placement. The site would be cleared of vegetation within construction limits to complete the grading. Temporary trailers equipped with power, heat, and portable sanitary facilities would be set up on the site. Fueling and light maintenance of construction equipment would be necessary on the site. Proper spill containment and stormwater best management practices would be utilized on the site.

Construction equipment such as earthmovers, cranes, material handlers, and trucks would be delivered and assembled as necessary. The site would be cleared and graded to accommodate construction of buildings and structures, roads, storage yards, and all other areas impacted by construction. If short-term disturbance areas are requested in association with the plant site, topsoil could be stockpiled and reused. Clearing limits would be defined on the site work plan. Cut and fill areas would be balanced to minimize off-site fill and disposal of spoils. The developed area of the site would be graded as one level area or different benched areas to accommodate existing contours. Large earthmoving equipment would be required to excavate the cut areas and move material to the fill or spoils area. Fill areas would be backfilled with suitable material and compacted to American Standards for Testing and Materials (ASTM) standards using equipment such as front end loaders, bulldozers, roller compactors, and water

trucks. Surface drainage would be designed in accordance with the requirements of the stormwater permit issued to the project.

Excavation and Foundation Construction

Underground utilities would be installed by excavating trenches using equipment such as backhoes and tracked excavators. Spoils would be either cast into piles along the trench for use as trench backfill or hauled by truck to an on-site spoils area. Bedding material such as sand, gravel or crushed stone may be required for some types of pipe and conduit. Bedding material may be available from an on-site source or it may be purchased and hauled from off-site by truck. After installation, the trenches would be backfilled with suitable material using equipment such as end loaders, bulldozers, and roller compactors.

Pilings, caissons, or drilled shafts may be required for foundation support under heavier equipment such as the boilers, stack, and steam turbines. Excavation depths would vary. For example, the turbine pedestal and stack areas should not be more than 30 feet deep, but the rotary railcar dumper excavation would be much deeper, perhaps 75 to 100 feet. Where required, the location, size, and type of supports would be determined by geotechnical investigations, foundation loads, and seismic consideration. Installation would be made with crawler cranes, vehicle-mounted augers, backhoes and other power equipment. Installation of piling requires the use of a large hammer or vibratory machine to drive or sink the pile into the ground. For caissons or drilled shafts an appropriate drill rig or auger is used to excavate cylindrical holes. After the shafts are excavated, reinforcing steel and the required cast-in-place concrete would be installed.

Excavations for foundations would be made with tracked excavators and other heavy equipment. Spoils would be hauled by truck to an on-site fill area for use in general grading. In rocky areas, the foundation holes may be excavated by drilling and blasting. Foundations in areas with a high water table are not anticipated; however, should they be encountered, the holes may need to be shored and/or dewatered prior to placing concrete.

After foundation excavations are completed, cast-in-place concrete footings or slab foundations would be installed. Size of the foundations would vary with the magnitude of the loads to be carried. Activities include placing side forms, reinforcing steel, drain piping, and anchor bolts into the foundation excavations, and encasing it all in concrete. The foundation excavation and installation would require access to the site by cranes, material trucks, and ready-mix trucks using access roads. Concrete would be produced both on site and purchased from off-site suppliers.

Excavations for the on-site landfill, raw water storage basins, and evaporation ponds would be completed using heavy equipment such as tracked excavators, backhoes, and bulldozers. Nevada Division of Environmental Protection-required lining and leak detection systems would be installed as would any necessary monitoring systems.

Building and Equipment Installation

Shop fabricated steel, architectural components, equipment components, and associated pieces and parts for building structures, and major equipment (e.g., boilers, steam turbine generators, feedwater heaters, transformers, stack, and air quality control systems) would be shipped to the site by truck or rail. Cranes would be used to erect structures and major equipment. Auxiliary equipment (e.g., pumps, fans, water treatment components) would be shipped to the site by truck or rail and assembled on site. Field fabrication areas would be established for an on-site

assembly of steel containments (e.g. hoppers, silos, tanks, ducts, etc.), pipe sub-assemblies, etc.

Construction of the rail loop and tracks would use standard railway construction techniques and would include staking; rail bed grading; the installation of ties, rail, switches and ballast; and final alignment. Specialized track laying equipment is typically used for this construction.

At the completion of the construction, temporary work areas and undeveloped areas of the site would be cleaned up and returned to near preconstruction conditions. Facilities with no future use such as temporary shops, warehouses, portable offices, and material laydown areas would be demobilized and these areas may be recontoured and revegetated to accommodate future Phases. Such facilities with an ongoing utilization would continue to be maintained in good condition.

Workforce and Equipment Requirements

During construction, the maximum workforce is estimated to peak at approximately 2,500 workers for Phase 1 construction, with most people housed at an off-site worker village and others housed in local communities. No estimate has been made for workforce size for Phase 2 construction because it has not been designed.

The worker village would be built on private land 5 miles north of the South Plant Site (see **Figure 2.2-2**) to accommodate non-local construction workers and their families as needed. It would be sized to accommodate a maximum of 2,500 workers for a five-year period (approximately 150 acres). The worker village would have on-site dormitories, eating facilities, a convenience store, community center and recreational facilities, first response medical and security facilities, and adequate parking for workers. To help accommodate workers during peak periods of employment, the worker village may also provide RV parking. The proposed site for the worker village would be serviced by a new Mt. Wheeler transmission line that would be constructed immediately adjacent to the proposed ROWs for the water pipeline and/or the alternative railroad and a short line into the worker village would be constructed. If required, fiber optic cable would be strung on the power lines or buried within the power line ROW and satellite service would be engaged. Potable water would be provided by on-site wells and sanitary sewage would be handled with on-site package sewage treatment plants or septic systems. Assuming a per capita use of 75 gpd, the worker village would use approximately 0.6 acre feet per day of water at peak population size. Municipal solid waste generated at the site would be hauled to the local solid waste landfill. The worker village would be dismantled and removed from the site upon completion of the power plant.

Vehicle and equipment requirements would vary substantially by construction phase and the structures and major equipment to be installed. Most of the vehicles and heavy construction equipment needed are listed in **Table 2.2-1**. Required construction vehicles and equipment would be transported to the site by rail and truck.

TABLE 2.2-1. HEAVY EQUIPMENT AND EQUIPMENT TRANSPORT VEHICLES REQUIRED FOR CONSTRUCTION

HEAVY EQUIPMENT	#		#
Scrapers	27	Front end loader: forklift	6
Backhoes	3	Scissors lifts	7
Bulldozers	11	Concrete trucks	20
Graders	3	Pick-up trucks	60
Compactors	8	Semi tractor trucks	7
Hydraulic Pickers	27	Worker lifts	40
Crawler crane	16	Stake truck	12
Dump truck	13	Water trucks	6
Excavators	3	Yard tractor trailers	30
Fork truck (material handlers)	8	Air compressors	8

2.2.1.3 Operations, Maintenance, and Abandonment

The power plant would be operated 24 hours a day, 365 days per year to provide electrical output throughout the year. Planned maintenance would be coordinated to reduce the impact of having a unit shutdown for maintenance and overhauls. Actual maintenance requirements for the plant would be influenced by the number of times the plant is started, the power output, and the quality of fuel.

Boiler Fuel Supply

Start-up fuel for the boilers would be low sulfur fuel oil. Fuel oil would also be used for unit shutdown and pulverizer transitions. Fuel oil would be stored on site in a tank farm fitted with secondary containment for the tanks and the fuel oil unloading area to contain any unexpected spills. During normal operations the power plant would burn low sulfur coal from the Wyoming Powder River Basin and other coals of similar quality. This would require a firm supply of approximately 22,000 tons of coal per day for Phase 1 of the plant.

Coal would be delivered by rail in unit trains of 135 to 150 cars. Coal unloaded from the trains could be stored in active storage piles enclosed by domes, uncovered outdoor inactive storage (long-term) piles or conveyed directly to the crushers and pulverizers for reduction in maximum particle size before being introduced into the boilers. Coal stored in the active and inactive piles can be reclaimed as needed for plant operation and conveyed to the crushers and pulverizers for reduction in maximum particle size before being introduced into the boilers.

Petroleum and Chemical Consumables

In addition to the boiler fuel supply, power plant operations would also consume at a minimum bulk quantities of lubricating oil, locomotive fuel oil, diesel fuel, gasoline, liquid ammonia, liquid caustic soda solution, liquid sodium hypochlorite, powdered activated carbon, hydrated lime, carbon dioxide, hydrogen, nitrogen, and sulfuric acid. These would be delivered by rail and bulk truck carriers. Smaller quantities of chemicals for use at the Plant Site would be delivered in totes and smaller packages (i.e. 55-gallon drums, 312 to 400 gallon tote/tanks) via truck.

If a water treatment system were constructed, this would also include lime, soda ash, and other chemicals used to soften water.

All bulk petroleum products would be stored in above-ground storage tanks fitted with secondary containment to hold any unexpected spills. Smaller quantities of chemicals would be stored in the plant in areas with concrete floors and sumps to contain any unexpected spillage.

Workforce and Equipment Requirements

The power plant would require approximately 150 full-time workers to operate and maintain the plant. It is anticipated that all permanent staff would live in local communities and be drawn from the regional labor pool. Some management and highly specialized positions may be filled by personnel from other Proponent facilities or from outside the region. The Proponents would have approximately 20 to 60 contract employees on site at the same time, depending on on-site combustion by-product disposal, coal train deliveries, and railroad agreement.

For operation of the plant, the anticipated heavy equipment would include: three 100-ton off-road trucks, one D10-type bulldozer, three 44-cubic yard scrapers, one rubber-tired bulldozer, three water trucks, two 15-cubic yard dump trucks, one compactor, one grader, two mobile cranes, one fire truck, two switch engines, vacuum truck, diesel fuel truck/tanker and one 20-cubic yard front end loader.

During power plant operation, fire and emergency response for the site would be provided by Nevada Power Company.

Access and Traffic

Access to the plant site would be from US-93 and then via a 24-foot wide paved site access road. Other paved and gravel roads would be constructed on-site as needed to serve the plant needs.

Vehicle traffic during operations would include employee vehicles traveling to the site, vendor deliveries to the site, and on-site vehicles handling coal and coal combustion byproducts. The power plant site would routinely receive coal deliveries by rail (384-427 trains annually). Bulk consumables such as fuel oil, lube oil, limestone, ammonia, caustic soda, and sulfuric acid may be delivered by rail or by truck. Smaller volumes of consumables, warehouse items, and office supplies would be delivered by truck.

Abandonment

The power plant is anticipated to have a commercial life of 50 years. Given that the property would have a significant infrastructure in place (water supply system, rail facilities, and electric transmission facilities); the property would be well-suited for continued use as a site for an electric generation facility or for another industrial use. If a determination is made to cease operations, the power block would be razed with foundations left in place, and the power plant site restored to a condition suitable for future industrial use. On-site rail, electric transmission, and water facilities would be left in place to support a future use of the property. Water storage and evaporation basins no longer required would be allowed to dry out and each basin would be closed in conformance with specified permit conditions. The landfill would be capped in accordance with applicable regulations and the solid waste permit.

2.2.2 Electric Transmission Facilities

To deliver the power generated by Phase 1 of the EEC, connect the northern and southern service territories, and to allow for the delivery of renewable resources to market, the Proponents propose to build approximately 250 miles of 500 kV transmission lines, new and expanded switchyards and interconnection to the existing 345 kV Falcon-Gonder line.

Specifically, the components of the electric transmission facilities for the EEC include:

- EEC 500 kV Switchyard
- EEC-Robinson Summit 500 kV transmission lines No. 1 & 2
    - EEC-RS #1
    - EEC-RS #2
- Robinson Summit 500/345-kV Substation
- Harry Allen-Robinson Summit 500 kV transmission line No. 1 (HA-RS #1)
- Harry Allen 500-kV Substation expansion
- Falcon-Gonder 345-kV line fold into Robinson Summit 500/345 kV Substation

The Proponents are also planning to build a 250-mile transmission line to accommodate Phase 2 of the EEC. The environmental impacts of this line are being evaluated in this EIS but it would not be built until the Phase 2 portion of the EEC plant site is constructed. More specifically:

- Harry Allen-Robinson Summit 500-kV transmission line No. 2 (HA-RS #2)

2.2.2.1 Elements and ROWs

The electric transmission facilities would consist of overhead 500-kV and 345-kV electric transmission lines and two electric substations (see **Figures 2.2-1 and 2.2-2**). The long-term ROWs needed for the electric transmission facilities would vary depending on the alternative below. **Table 2.2-2** provides a description of each transmission line segment for a better understanding of the transmission line segment naming and proposed phased construction.

TABLE 2.2-2. TRANSMISSION LINE SEGMENT NAMING CONVENTION

LINE NAME	DESCRIPTION	SEGMENTS INCLUDED
EEC-RS #1 Line	500-kV transmission line from EEC leading to the Robinson Summit Substation. This line would facilitate early testing of Phase 1 of the plant.	4A, 1D, 1E
EEC-RS #2 Line	500-kV transmission line from EEC leading to the Robinson Summit Substation. This line would be built prior to completion of Phase 1 of the plant.	4A, 1D, 1E
RS-HA #1 Line	500-kV transmission line from Robinson Summit Substation leading to the Harry Allen Substation. Constructed for Phase 1 of the project.	6A, 6C, 8, 9B, 9A, 9D, and 11
RS-HA #2 Line	500-kV transmission line from Robinson Summit Substation leading to the Harry Allen Substation. Constructed for Phase 2 of the project.	6A, 6C, 8, 9B, 9C, 9D, and 11 10 (alternative)
EEC-HA #1 Line	If the Robinson Substation is not built, then the 500-kV transmission line would extend from a substation at the EEC and lead to the Harry Allen Substation. Constructed for Phase 1 of the project.	4A, 1D, 1G, 6C, 8, 9B, 9A, 9D, and 11
EEC-HA #2 Line	If the Robinson Substation is not built, then the 500-kV transmission line would extend from a substation at the EEC and lead to the Harry Allen Substation. Constructed for Phase 2 of the project	4A, 1D, 1G, 6C, 8, 9B, 9C, 9D, and 11 10 (alternative)

EEC 500-kV Switchyard

The switchyard at the South Plant Site would transfer the electricity generated to the transmission system. It would require approximately 50 acres within the proposed 500-acre ROW at the plant site. This would connect the EEC with the 500-kV transmission lines leading from the station to the SWIP Corridor and the Robinson Summit Substation.

500-kV Transmission Lines from EEC to Robinson Summit Substation (EEC-RS)

Two new 500-kV transmission lines (EEC-RS #1 and #2) would be constructed from the EEC switchyard to the SWIP Corridor and would then be within and follow the SWIP Corridor south to the 500/345-kV Robinson Summit Substation. These 500-kV transmission lines would follow the route incorporating Segments 4A, 1D, and 1E for approximately 34 miles (**Figures 2.2-1 and 2.2-2**). The long-term ROW would be 200 feet wide per transmission line for a total of about 1,650 acres. Typical spacing between the lines would be 1,800 feet which would accommodate other utilities. The spacing between the lines outside of the SWIP Corridor is proposed at 1,600 feet between the EEC and Robinson Summit Substation and proposed for 1,800 feet for the remainder of the routes. An additional short-term construction ROW would include approximately 30 miles of access across existing roads. At an average of 30 feet wide, this short-term construction ROW would be about 110 acres. In some areas existing dirt roads would require widening or other improvements to accommodate the construction equipment. The Proponents would coordinate with responsible agencies and property owners to acquire approvals (e.g. short term rights-of-way) to use and, in some cases, to improve these access roads. The final locations and widths of these access roads would be identified in the COM Plan.

The EEC-RS #1 line would be constructed early enough to facilitate testing of Phase 1 of the EEC power plant. The EEC-RS #2 line to the Robinson Summit Substation would be constructed prior to completion of Phase 1 of the power plant.

Figure 2.2-4 contains typical representations of planned transmission towers. The height of and spacing between each tower would be determined based on detailed engineering and be dependent on the type of tower used and the terrain. Typically, single-circuit steel H-frame and lattice towers would both be 100-185 feet tall. On flat terrain, each tower would have a long-term disturbance footprint of 66 x 66 feet (0.1 acres) and construction would temporarily disturb an area measuring 200 x 220 feet (1 acre). In rough terrain each tower would have a long-term disturbance footprint of 200 x 220 feet (1 acre) and construction would temporarily disturb 200 x 440 feet (2 acres). It is possible that other structure types would be used (e.g., guyed vee structures); however, the footprint of these structures would be similar to the structures described above. For impact analysis purposes, it was estimated that average span lengths between structures would measure approximately 1,050 feet, resulting in an average of five structures per mile per line.

Temporary construction yards, major material yards, other temporary areas, and concrete batch plant sites would all generally be located outside the transmission line ROW on private lands. These sites may be separate, but can be co-located as needed. These sites would be up to 40 acres in size and be located about every 50 miles along the ROW to maintain reasonable workforce, equipment, and materials transport times.

Robinson Summit Substation

Assuming the proposed White Pine Energy Station and its proposed 500/345-kV substation at Robinson Summit receives approval and is built prior to the EEC, it would need to be modified or expanded to accommodate the additional power from the EEC. The substation site would be located near the SWIP Corridor approximately 20 miles northwest of Ely. It would require a long-term ROW of approximately 80 acres, including a 50-foot wide access road from US-50. A 200-foot microwave tower would also be installed.

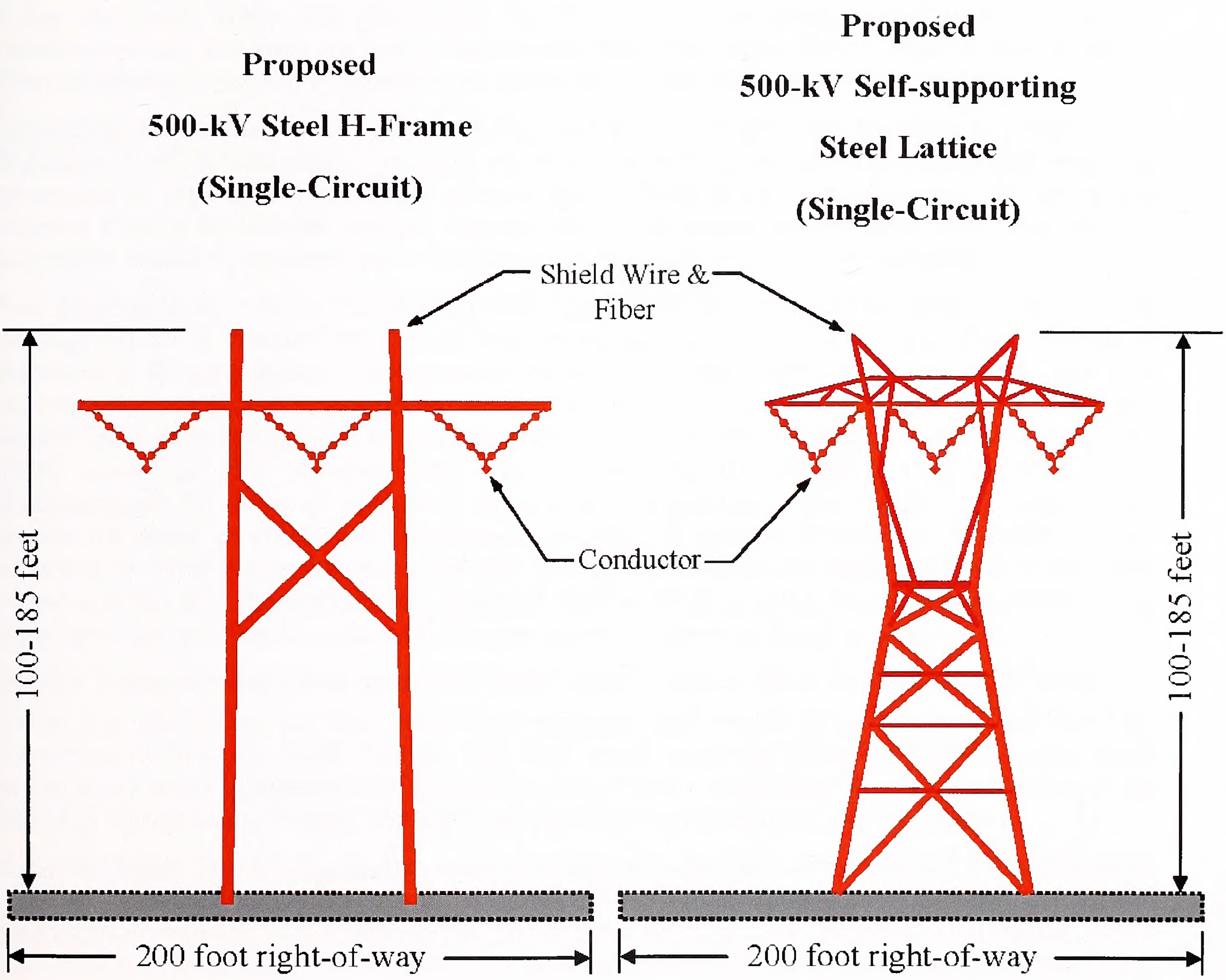
The existing Falcon – Gonder 345-kV transmission line would be looped into the Robinson Summit Substation to interconnect the South Plant Site to the SPPC electric system. The two 160-foot wide transmission line ROWs and access roads, approximately 1-mile in length, would require a 40-acre ROW grant. The new lines would be called the Falcon-RS and the RS-Gonder.

500-kV Transmission Lines from the Robinson Summit Substation to Harry Allen Substation (RS-HA)

Phase 1 includes the construction of the RS-HA #1 transmission line. The RS-HA #2 line would be constructed during Phase 2. However, both lines are analyzed in this EIS.

The RS-HA #1 line would extend south from the Robinson Summit Substation within the SWIP Corridor and incorporate Segments 6A, 6C, 8, 9B, 9A, 9D, and 11 (**Figures 2.2-1** and **2.2-2**). This line deviates slightly from the SWIP Corridor to connect to the Robinson Summit Substation. It also deviates from the SWIP Corridor near the Cove and Silver King Pass areas along Segment 6C, and again at Segment 9A. These deviations primarily result from topographic constraints in the SWIP Corridor. If the lines were left at the standard construction line spacing, environmental impacts and safety risks to construction personnel and equipment would likely increase due to the difficulty of construction activities in steep terrain and the amount of surface disturbance required for safe installation of the transmission lines. The total length for the RS-HA #1 would be approximately 236 miles. The RS-HA #2 would follow the same alignment, except that it would stay within the SWIP Corridor and follow Segment 9C instead of 9A. The linear distance of RS-HA #2 would be shorter by only 2 miles, for a total length of 234 miles.

The long-term ROW would be 200 feet per transmission line for a total area of 11,394 acres (assuming both lines with an average width of 235 miles). An additional short-term construction ROW would include approximately 320 miles of access across existing roads. In some areas existing dirt roads would require widening or other improvements to accommodate the construction equipment. The Proponent would coordinate with responsible agencies and property owners to acquire approvals (e.g. short term rights-of-way) to use and, in some cases, to improve these access roads. At a maximum of 30 feet wide, this short-term construction ROW would be about 1,150 acres. Approximately 10 acres of long-term ROW would be required for fiber optic regeneration sites along the ROW (40 acres for short-term construction ROW). Power distribution ROWs for fiber optic sites would be approximately 100 acres. Transmission tower designs and footprints would be the same as above (see **Figure 2.2-4**).



Drawing Not to Scale

FIGURE 2.2-4
TYPICAL SINGLE-CIRCUIT TOWER DESIGNS
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Short-term construction yards, major material yards, other temporary areas, and concrete batch plant sites would all be located as stated above.

Harry Allen Substation

The existing ROW for the Harry Allen 500-kV substation, located about 20 miles northeast of Las Vegas, would be expanded by approximately 40 acres to accommodate the additional equipment to support the EEC Project.

EEC 500/345-kV Substation Alternative

If the proposed Thirty Mile Substation for the White Pine Energy Station is not already constructed and available for use to electrically interconnect the EEC Project at the Robinson Summit location, then the Proponents would instead propose the following alternative.

Combining the 500/345-kV equipment at the plant site would eliminate the need to construct the Robinson Summit Substation. The purpose of this substation would be to transfer the electricity generated by the power plant to the 500-kV electric transmission system and to connect to the existing Falcon to Gonder 345-kV transmission lines south of the plant site. The 80-acre substation would be included within the proposed 500-acre ROW at the plant site.

Two approximately 13-mile transmission line folds (Segment 3) would be constructed from the existing Falcon to Gonder 345-kV line near Hercules Gap north to the South Plant Site along Segment 3 (**Figure 2.2-2**). The existing Falcon to Gonder 345-kV line would be split and reconfigured into two distinct and separate lines, one now connecting Falcon to EEC and the second now connecting EEC to Gonder (Falcon-EEC and EEC-Gonder lines). The long-term ROW would be two 160-foot wide transmission line ROWs for a total of 504 acres. Approximately 21 miles of temporary access across existing roads (at 30 feet wide) would require 76 acres of short-term construction ROWs. If portions of existing dirt roads require widening or other improvements to accommodate the construction equipment, the Proponents would coordinate with responsible agencies and property owners to acquire approvals (e.g. short term rights-of-way) to use and, in some cases, to improve these access roads.

500-kV Transmission Lines from EEC Substation to Harry Allen Substation (EEC-HA)

Under this alternative, two new 500-kV transmission lines would be constructed from the EEC substation north to the SWIP Corridor and then would generally follow the SWIP Corridor south to the Harry Allen Substation (EEC-HA #1 & #2). Phase 1 only includes the construction of the EEC-HA #1 transmission line. The EEC-HA #2 would be constructed during Phase 2.

If the Robinson Summit Substation were not built, then the EEC-HA #1 would follow the same route as explained above (including the same SWIP Corridor deviations noted previously) with the notable exception of by-passing the former substation site with Segment 1G (**Figure 2.2-1**). The total length for EEC-HA #1 would be approximately 270 miles. With the exception of by-passing the former Robinson Summit Substation site, EEC-HA #2 would follow the same alignment (including Segment 9C instead of 9A). The linear distance of EEC-HA #2 would be shorter than EEC-HA #1 by only 2 miles, for a total length of 268 miles. The permanent ROW would be 200 feet per transmission line for a total of 13,042 acres for both lines.

Transmission tower designs would remain the same as previously discussed (see **Figure 2.2-4**).

SWIP Corridor Alternatives

To address the topographic and construction constraints in the SWIP Corridor that may compress transmission line spacing to a less than optimum distance, two SWIP Corridor

Alternatives are proposed (see **Figure 2.2-1**). The SWIP Corridor alternatives below apply to the variable routing options discussed above.

Alternative Segment 9A – Both Lines

From the southern terminus of Segment 9B, both 500-kV transmission lines, either RS-HA #1 and #2 or EEC-HA #1 and 2, would deviate from the SWIP Corridor and be routed along Segment 9A. Both lines would then rejoin Segment 9D and proceed to Segment 11. This alternative would increase the distance of Line 2 by just over 1 mile for a total length of 269 miles.

Alternative Segment 10 – Single Line

From the southern terminus of Segment 8, either RS-HA #1 or EEC-HA #1 would continue south and follow Segments 9B, 9A, and 9D. The RS-HA #2 or EEC-HA #2 would deviate from the SWIP Corridor and follow Segment 10 across the Delamar Mountains and rejoin the SWIP Corridor and Line 1 at the beginning of Segment 11. This alternative would increase the distance of Line 2 by approximately 10 miles for a total length of 278 miles.

Fiber Optic Communications

Fiber optic communications cables would be installed within or below the ground wires on both the EEC-RS #1 and RS-HA #1 500-kV transmission lines, and on the existing 345-kV line from RS-Gonder. These cables would be supported by the transmission structures and strung along with the transmission cables during construction. Fiber optic regeneration stations require an equipment enclosure, fenced area, and power supply approximately every 50 to 70 miles within the transmission ROW to transmit the signals over long distances. Fiber optic regeneration stations would be less than one acre in size. New electric power distribution would be required for the fiber optic regeneration stations. Electric power distribution locations for these sites would be selected based on availability from the local providers.

2.2.2.2 Construction Activities

Site Preparation and Mobilization

All the activities described below would be fully described in the COM Plan that would be completed and approved prior to release of a NTP for any portion of construction.

Pre-construction surveying and soil testing activities would take place along the ROW in advance of the start of construction. These surveys would locate the major angle points along the line, spot the individual structures, locate the construction boundaries and test soil at numerous locations. Short-term access would be required to facilitate these surveys. Also, all short-term major material yards, constructions yards, construction staging areas, wire stringing and tensioning sites, and concrete batch plant sites located outside of the environmental study area would be identified and surveyed for the COM Plan.

Construction survey activities would consist of staking the structures center hub and foundation locations, flagging construction boundaries, installing signs, and flagging construction access roads.

Construction Mobilization

Construction mobilization activities include contractors obtaining permits, labor force, and the necessary equipment to accomplish the construction of the transmission lines. Also during mobilization and other pre-construction activities, temporary material storage yards, construction yards and concrete batch plant sites would be located and established outside the ROW. Three major material yards (15 to 40 acres), construction yards (up to 40 acres), and concrete batch

plant sites (5 to 40 acres) would be located on private land to support transmission line construction activities along the ROW.

Short-term construction staging areas within the ROW would generally be located at areas designated for pulling and tensioning sites, splice sites, or work areas previously described. These areas would be used to temporarily lay out materials, marshal crews, and stage equipment to be used for work on specific project activities at nearby locations.

Construction Utilities

Generally, no new electric power distribution, temporary water, sewer, or communications would be required for construction of any of the transmission line or substation facilities. Temporary construction power would be provided by small portable on-site generators. Temporary water would be imported in water trucks from existing sources. Sewer would be provided by temporary portable facilities. Communications would be provided by existing cellular telephone providers and through existing 800 MHz radio communication facilities.

Once available for the plant site, electrical power distribution, service level communications, and temporary water would be provided from facilities developed for the plant site. Electric power distribution is currently available at the existing Harry Allen Substation.

Short-term construction yards, major material yards, and concrete batch plant sites would all require electric power distribution, water, sewer, and communications. Locations for these sites would be selected based on the availability of these services from local providers.

Mineral Material Borrow Areas

All borrow material would be obtained from existing private suppliers. No new off-site borrow areas would need to be opened specifically for construction of the transmission lines.

Access Road Construction

Equipment access is required to every transmission structure. The project would use existing access roads both inside and outside of the ROW wherever practical to minimize the construction of new roads. It is anticipated that existing dirt roads would require both upgrade and maintenance during construction to provide safe access to each structure site and to maintain adequate level of service to other public users. The Proponents would coordinate with responsible agencies and property owners to acquire approvals (e.g. short term rights-of-way) to use and, in some cases, to improve these access roads. In areas where existing access roads do not provide adequate access to construction sites, roads would be improved and/or new roads would be built. New roads would consist of either short spur roads from existing roads to construction sites, longer linear roads to connect the ROW to existing access roads, and parallel centerline access roads that connect one structure to the next between other access roads. New spur roads and roads that parallel the centerline would be located within the ROW whenever practical and would be located to minimize visual impacts. The number of new spur roads would be held to a minimum, consistent with their intended use (e.g., structure construction or conductor stringing and tensioning).

All new and improved roads would be constructed by the construction contractor. In areas of steep terrain, the roads would be built so that there would be approximately 20 feet of travel way. Curved areas would need to be wider than 20 feet to accommodate long loads and large equipment. The total disturbed width of the road (toe of fill to top of cut) in steep terrain would vary depending on the terrain. In flat terrain, the road would be built so that there would be approximately 20 feet of travel way which may require up to a 30-foot disturbed area.

Clearing and Grading

At each structure site, work areas are required to facilitate the safe operation of equipment and construction operations. Typical short-term work areas in flat terrain are 200 feet by 220 feet. When practicable, access within the work area would be overland travel with minimal to no grading required in the work site. In other work areas, vegetation would only be cleared to the extent necessary. After line construction, all work areas identified as short-term disturbance on the structure location drawings would be restored.

Short-term work areas on steep or rough terrain would vary depending on the site conditions. Where topography requires, work areas would be expanded beyond the typical 200 feet by 220 feet dimensions up to 200 feet by 440 feet. These expanded work areas for rough terrain would be partially cleared and graded to accommodate the safe operation of heavy equipment and cranes. In steep terrain, a crane pad would be required for maintenance of the structure. This crane pad and the access road to the structure would remain after construction. Extensive grading along steep slopes may be required to accommodate structure sites. Where feasible, portions of the site would be restored. Water diversion structures and other erosion control devices would be installed according to NDEP water quality permit requirements.

In forested areas, trees would be removed within planned travel areas to allow construction vehicles access and in the right-of-way as needed for electrical clearance under and around the transmission lines and towers. Tree removal would be selective and would not include every tree in the 200 foot or 160 foot wide right-of-way. Generally all trees over 15 feet in height within 75 or 55 feet of the centerline would be removed to provide the required line clearance. Tree trimming would be conducted to allow for a ten-year growth envelope.

Excavation and Foundation Construction

Excavations for foundations and anchors would be made with vehicle-mounted augers, backhoes, and other power equipment. In rocky areas, the holes may be excavated by drilling and blasting, or special rock anchors may be installed. In extremely sandy areas, soil stabilization by water or a gelling agent may be used prior to excavation. In areas with a high water table, holes may need to be shored and/or dewatered prior to the installation of concrete.

After excavations are completed, the required footings and/or anchors would be installed. Depending upon the type of structure selected and the soil conditions any one of the following footing types could be installed: cast-in-place concrete, pre-cast concrete, steel grillage, tubular steel, or micro-piles. Also, plate, grouted soil, rock, or other types of anchors may need to be installed along with the footings. The foundation and anchor excavation and installation would require access to the site by the excavation equipment described above and a crane, material trucks, ready-mix trucks, water trucks, and other large equipment using the construction access roads.

Foundation and anchor excavations would not be left open or unfenced. Excavations would be covered and/or fenced where practical to protect the public, wildlife and livestock. Soil removed from excavations would be used as backfill, road fill, or spread within the structure work area to blend with the natural terrain. After construction is complete salvaged topsoil would be placed over excavated material.

Structure Assembly and Erection

Structure components and associated hardware would be shipped to each structure site by truck. Steel members would be assembled, hoisted into place by a large crane, and then fastened together to form a complete structure. If structures are erected by helicopter instead of

by cranes, then the structure components and associated hardware would be shipped to each helicopter fly yard by truck. Steel members would be assembled into components that the helicopter can safely transport, flown to the structure sites by helicopter, and then fastened together to form a complete structure. In areas where the structure would be erected by helicopters, helicopter fly yards would generally be located every 10 miles along the transmission centerline.

Prior to conductor installation, structure footing resistance along the route would be measured. If needed, counterpoise (additional grounding) would be installed at each structure. Counterpoise consists of galvanized steel or copperweld cable buried a minimum of 12 inches deep, extending from one or more structure legs for approximately 200 feet, within the ROW. In some cases ground rods and other grounding techniques are used in lieu of counterpoise.

Conductor Installation

After the structures and poles are erected, insulators, hardware, and stringing sheaves would be delivered to each structure site by truck and installed. For public protection during wire installation, temporary guard structures would be erected at crossings over highways, railroads, power-lines, structures, and other obstacles. Temporary guard structures normally consist of wood H-frame poles placed on either side of an obstacle. These structures prevent ground wire, conductor, or equipment from falling on an obstacle. Equipment for erecting guard structures includes augers, line trucks, pole trailers, and cranes. Guard structures may not be required for small roads or protection may be accommodated by line trucks suspending cross arms or pulleys. On other occasions, other safety measures such as barriers, flagmen, or other traffic control would be used to provide the required protection.

Next, a helicopter would string a pilot line from structure to structure through the stringing sheaves. This would be followed by a stronger pulling line that would be attached to a tensioner on one end and a power puller on the other. Finally, the ground wire, fiber optic cable, and conductors would be pulled and installed each in a controlled tension manner (see **Figure 2.2-5**). Implosive sleeves would be installed for conductors and ground wires.

The fiber optic cable splice points would be routed down the structure to a splice box mounted on the structure or buried at the base of the structures. Fiber optic regeneration stations would be constructed along the transmission ROW utilizing pre-fabricated control enclosures, security fencing, and require the installation of primary and back up power and communication equipment.

Work areas for tensioning equipment and pulling equipment are approximately 200 feet by 700 feet and would be required approximately every 2 to 4 miles. However, when construction occurs in steep and rough terrain, these sites could require larger, less symmetrical pulling and tensioning sites. Once construction starts, it is probable some of the pulling and tensioning sites may be relocated. This relocation may be required to accommodate changing construction techniques, or material and design changes.

Substation Construction

In the proposed substation development and expansion areas, topsoil and organic matter would be cleared and stockpiled. The site would then be graded and compacted to provide a construction surface for the proposed equipment. The surfaces would be slightly sloped and other features, such as ditches and culverts, would be installed for adequate drainage. The stockpiled topsoil and organic material would be placed on cut-and-fill slopes.

After grading is complete, fencing would be installed around the perimeter of the substation for security and to restrict unauthorized persons and wildlife from entering. Reinforced concrete footings and foundations would then be constructed to support structures and equipment. Buried conduit and/or a pre-cast concrete trench system would be installed throughout the substation for electrical control cables. A ground grid consisting of buried cables approximately 12 inches below grade would also be installed to ensure that all equipment, structures, and fence components are properly grounded. Gravel or a road base type material would be installed over the substation pad to provide electrical isolation for workers, a suitable working and drive surface, to inhibit weed growth, and to reduce fugitive dust.

Steel structures would be erected on the concrete footings to support switches, electrical buswork, and other equipment, as well as termination structures for the incoming and outgoing transmission lines. Structures would be fabricated from tubular steel and galvanized or painted with a non-reflective finish to match existing structures. Major equipment would be set by crane and either bolted or welded to the foundations to resist seismic forces. Oil spill containment basins would be installed around all major oil-filled equipment. Control cables would be installed throughout the substation from equipment back to a central control enclosure. The control equipment would be set to the proper settings and tested before the substation is energized.

Workforce and Equipment Requirements

All of the transmission line and most of the substation work would be performed by at least one prime contractor for the transmission line work, and multiple prime contractors for the substation work. In addition, each prime contractor would likely employ multiple subcontractors to supplement their own workforce. During peak construction periods for the first phase of work, approximately 500 workers would be employed. The peak construction period is expected to last about 18 months of the approximate 24-month transmission line project.

Because the construction work would be contracted, the geographic region of the work force is not yet known. Local and out-of-town labor would depend on the local labor market conditions, contractor's labor force availability, construction status, and time of year. Local labor could comprise 10 to 20 percent of the total workforce and out-of-town labor would comprise the rest of the workforce. It is assumed this workforce would move with construction and find temporary housing in adjacent communities.

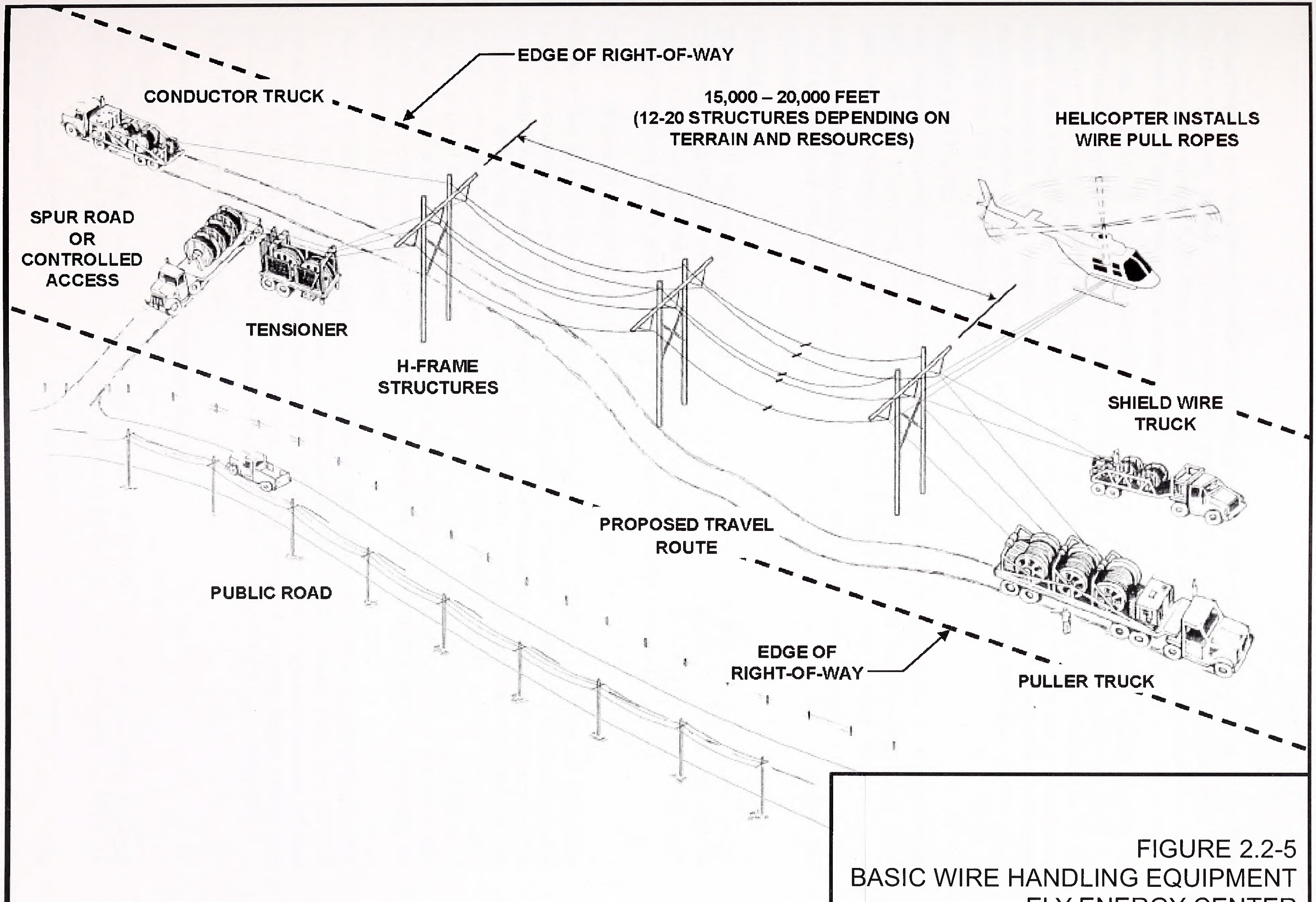
Vehicle and equipment requirements would include a variety of heavy equipment like bulldozers, backhoes, vehicle-mounted augers, concrete trucks, and cranes. Specialized equipment to install structures and conductors would also be used, including: line trucks, a tensioner, ground wire trucks, puller trucks, pole trailers, and helicopters.

2.2.2.3 Operations, Maintenance, and Abandonment

The electric transmission lines, switchyard, and substations would be operated 24 hours per day, 7 days per week, every day of the year. The electric substations would be visited regularly to perform routine maintenance and ensure they are functioning correctly. Vegetation would be trimmed as-needed under and along the transmission line ROW to minimize potential interference with the transmission lines.

Workforce and Equipment Requirements

Planned operations and maintenance on transmission lines would consist of an annual helicopter or vehicle line patrol by two linemen. It would probably take two days per year to patrol the proposed transmission lines. Additional unscheduled patrols may be required by ATV, truck, or bucket truck, if issues are encountered. Unplanned operations and maintenance may



Source: Sierra Pacific Power Co., *Alturas Transmission Line Draft EIR/IS*, June 1997.

FIGURE 2.2-5
BASIC WIRE HANDLING EQUIPMENT
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be required to correct failures. These are normally site-specific issues (e.g., damaged insulator on one structure, erosion around foundation, post fire inspection, etc.). Whatever labor and equipment is required to fix the problem would be dispatched. Unplanned maintenance could involve 40 to 80 worker days on average per year.

Planned operations and maintenance on substations and switchyards would consist of numerous equipment testing and maintenance requirements. All major equipment such as transformers, reactors, and breakers receive annual inspections (operation verification, visual inspections, infrared inspections, etc.). More intensive inspections and tests are conducted on major equipment every three to five years (oil samples, switch alignment, and manufacturer scheduled maintenance). Based on the proposed project scope, workforce requirements could total 200 to 400 worker days per year.

Access and Traffic

The electric transmission lines would be inspected from the ground or the air on an annual basis. Ground inspections would be conducted generally following the centerline travel route used for construction. This path may also be utilized for required maintenance or repair.

Access to the Robinson Summit Substation would be from US-50 over an existing dirt road that would be widened and improved and then a new dirt or gravel road that would extend to the substation site.

Abandonment

The new electric transmission facilities would be integrated into the Proponent's existing electric transmission systems. The facilities would be operated and maintained for the foreseeable future. If at some point these facilities were no longer needed as part of the electric system, then the transmission towers and lines would be removed and the area restored.

2.2.3 Water Supply Facilities

Water delivered to the power plant would be used primarily for steam generation, air emissions control, and cooling purposes (water use allocations are provided in **Section 2.2.1.1**). Additional water uses would include in-plant potable water, plant maintenance and wash down, plant fire protection, and other miscellaneous plant requirements. The power generation equipment for Phase 1 of the EEC project, including all ancillary uses, would require a total annual water consumption of 8,000 acre-feet per year (AFY). Raw water would be delivered to and stored in two open ponds with a combined capacity of approximately 190 million gallons on the plant site. Water from these ponds would be treated or conditioned on-site to the degree necessary for each purpose for which it is used.

The water facilities would be designed to deliver an average annual water supply of 8,000 AFY for Phase 1. This annual requirement is equivalent to an annual average daily flow of 7.15 million gallons per day (mgd) or approximately 5,000 gpm (11.1 cfs). A peaking factor of 1.6 has been applied to the average daily flow to determine the system's required water supply and delivery capability. This results in a system design delivery capacity of 8,000 gpm (16.7 cfs).

2.2.3.1 Elements and ROWs

Lages Station Well Field – the Proposed Action

Well Field

The Proposed Action well field would be located on private land within existing irrigated properties that the Proponents have under contract options or have purchased in Northern

White Pine County near Lages Station in Steptoe Valley (see **Figure 2.2-2**). The Proposed Action includes pumping 8,000 AFY (8,000 gpm for six months and 2,000 gpm for the remaining six months of the year). The current well field plan would include six wells, each with a pumping capacity of approximately 4.2 cfs or approximately 1,900 gpm to 2,000 gpm each. Four wells pumping simultaneously at this pumping rate would be required to meet the required peak demand flow of 8,000 gpm. Actual numbers and location of wells and operational schemes might vary.

Each water well site would be approximately 100 x 100 feet in size and would be graveled for an all weather surface. Short-term ground disturbance during drilling and construction would be approximately 300 x 300 feet. Graveled 20-foot wide access roads would also connect to the well sites. Pipes estimated at 18 inches in diameter would lead from the wells to the well field pumping station.

In addition to the main water supply wells, a construction water supply well would be drilled at the plant site to provide water during initial construction of the power plant. This well would be pumped at an average rate of 175 gpm to provide 282 AFY of water for construction purposes. After construction is complete, the on-site well would continue to be used as a potable water supply, yielding 10 AFY of water. This construction water well would be required for all other water supply alternatives.

<u>Pumping Station and Forebay</u>

The pipeline from near Lages Station would require a booster pumping station at the well field (10 acres of area included in the Lages Station Water Supply total acreage). An above ground reservoir at the pumping station would be required in order to maintain flooded suction conditions for the booster pumps and to allow cycling/resting of well pumps. The contained volume of the reservoir or forebay would be between 1.0 and 1.5 million gallons to provide sufficient interim storage for prudent well field and booster pump operation and to provide a few hours buffer in the event of a short term primary power outage. The pumping station and forebay would be located on private land at the well field and would pump water into the pipeline leading to the power plant site. As previously described, Mt. Wheeler would provide the required power capacity for the well field and pump stations with the construction of a new 69 kV transmission line to the area.

The well houses and pumping stations are designed to include a standby diesel-engine-driven power generation set to provide heat in the buildings in the event of a power outage. Larger generators would be required to power the pumps during power outages. If the Proponents elect to install standby generators to power one or more pumps, the generators would be designed to come on-line automatically if the primary electrical power source fails. Generator sets have been preliminarily sized to operate one well pump at the well field and two booster pumps at the booster stations. Two pumps operating at a booster station would provide approximately 80 percent of the average daily water requirement for the Phase 1 Power Plant.

Installed standby generators of a size to power pumps, would require an external double-contained aboveground fuel storage tank. The size of on-site fuel storage to power pumps would depend upon several factors including fuel consumption rate and the number of days of run time desired between refueling.

<u>Water Pipeline from Lages Station Well Field to EEC</u>

The pipeline alignment shown in **Figure 2.2-2** would follow the alignment identified for the alternative rail line (**Section 2.2.4.1**). The width of the pipeline ROW would change depending

on whether the alternative rail line is constructed. If the pipeline were constructed without the rail line, a short-term construction ROW of 200 feet and a long-term ROW width of 60 feet would be required for the water pipeline (**Figure 2.2-6**). If the rail line and pipeline were constructed in the same ROW, a short-term construction width of 300 feet and a long-term ROW of 200 feet would be shared by the rail line and pipeline (**Figure 2.2-7**). The length of the pipeline from Lages Station Well Field to the South Plant Site would be approximately 44 miles. This ROW would also contain the Mt. Wheeler transmission line that would be constructed within this ROW from the South Plant Site to the Lages Station Well Field.

In addition to the pipeline short-term ROW there would be possible short-term borrow pits and construction material yards. Each yard would have storm water runoff controls, fencing, security, and some may contain office trailers. Office trailers may also be on separate pads outside of the yard, and there may be more than one location for these as well. It is anticipated that the contractor would keep all yards near the construction ROW if possible. Pipeline material yards would be approximately 15 feet x 250 feet and they would be positioned within the 200-foot waterline short-term ROW about every 5 miles along the construction area. This would result in approximately 7 acres of short-term disturbance. The number of yards would depend upon the final alignment. Existing roads (paved, gravel, four-wheel drive) would be used where possible for access and some improvements to existing roads may be needed. The Proponents would coordinate with responsible agencies and property owners to acquire approvals (e.g. short term rights-of-way) to use and, in some cases, to improve existing access roads. Construction roads would be built within the short-term ROW along the pipeline. These roads would be maintained for transportation of equipment, material, crews, inspectors, and dust control water.

The pipeline would be a single 24- to 30-inch diameter pipe and would be buried with a minimum of 5 feet of cover. The pipeline would be constructed of ductile iron, steel, or HDPE or a combination of these materials. Pipeline appurtenances would include air and vacuum release valve stations, blow-off (drain) valve stations, isolation valve stations, and metering stations. These appurtenances may be located in underground vaults at various points along the pipeline to facilitate pipeline operation and maintenance.

Air and vacuum release valves would have above ground screened air vent pipes (approximately 4 feet above ground) protected by concrete filled bollards. Blow-off stations would have a drain pipe routed to drain the pipeline to natural drainage courses if necessary for repairs. Outlets of these drain pipes would be fitted with energy dissipaters to reduce soil erosion.

Duck Creek Impoundment Water Supply Alternative

During past operations, the Kennecott copper milling and smelter operations at McGill used water piped from a water storage reservoir along Duck Creek southeast of Gallagher Gap. This is a reliable source of good quality water that is currently used seasonally for irrigation of reclamation vegetation at the Kennecott tailings area. Excess water not used by Kennecott is currently discharged to the Duck Creek drainage system downstream of McGill. The Proponents have proposed to buy 8,000 acre feet or more of the Kennecott Duck Creek water supply. If negotiations with Kennecott were successful, surface water rights from the existing Duck Creek Impoundment (8,000 AFY for Phase 1) would be secured and, together with a new water pipeline to the South Plant Site would be utilized in place of the Lages Station well field(s), so long as the water flow and quality from the reservoir continued on a consistent basis. No pumping stations would be required as the pipeline from Duck Creek would be gravity fed.

Modifications to the existing Duck Creek Impoundment dam, as well as new inlet and outlet structures, would be required to utilize this water source. A new 24- to 30-inch diameter pipeline would be constructed from the dam to the Proposed Action plant site along the ROW shown on **Figure 2.2-2**. The long-term pipeline ROW would be approximately 6 miles long and 60 feet wide (44 acres). The short-term ROW would be 125 feet wide. The reservoir is on private land and would not require a ROW.

At this time, Kennecott has indicated it has no interest in selling water from the Duck Creek Impoundment described above. Accordingly, alternative sources of groundwater and pumping locations have been identified, to potentially reduce the impact of pumping and piping all of the groundwater requirements from the Lages Station well field.

Reduced Lages Station with Coyote Valley Ranch Well Field Alternative

This water supply alternative would involve the same well field located near Lages Station and includes pumping at a reduced rate of 6,000 gpm from the Lages Well Field area for six months of the year, and no pumping for the remaining six months, for a total of roughly 5,000 AFY. The rest of the water required for plant operations would be pumped at a rate of 2,000 gpm throughout the year from two wells located on private land (Coyote Valley Ranch) further south in the Steptoe Valley, a total of approximately 3,000 AFY (**Figure 2.2-2**). The description of the water wells and booster pump station for each well field would be the same as for the Proposed Action (Lages) well field. A short segment of water line would be constructed from the Coyote Valley Ranch to the main water line constructed between Lages Station and the South Plant Site. The water source for the wells outside the Lages Station well field would be private water rights in Steptoe Valley diverted to the new location, White Pine County water rights permitted for power generation (should they be available for use by the Proponents) or a combination of both.

Reduced Lages Station with Limited South Well Field Alternative

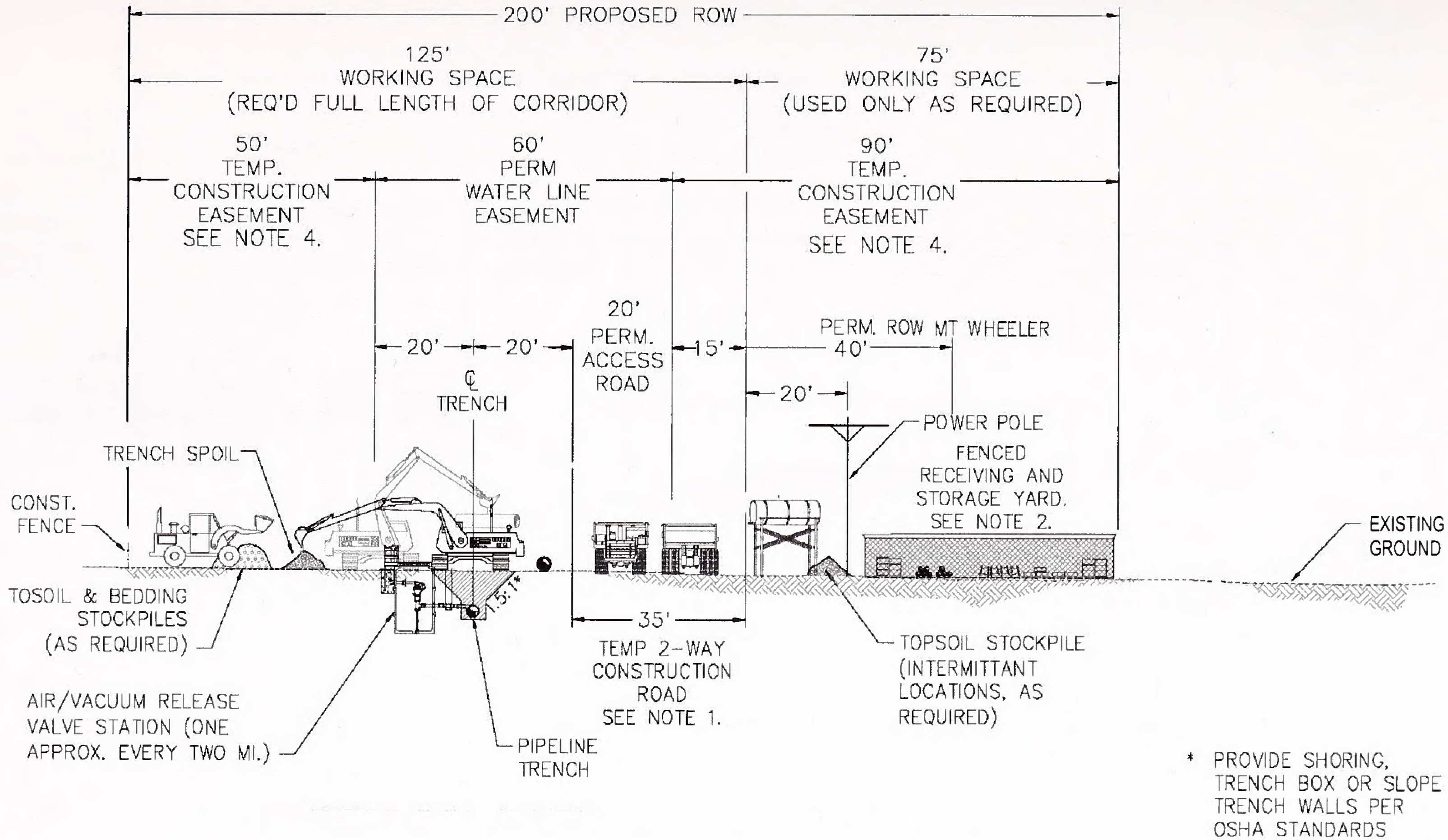
This water supply alternative would include pumping at the rate of 6,000 gpm from the Lages Well Field for six months and nothing for the remaining six months (total of roughly 5,000 AFY). It would also include pumping approximately 750 gpm from each of three wells located along the pipeline route adjacent to the South Plant Site for a total of approximately 3,000 AFY (**Figure 2.2-2**). The description of the water wells and booster pump station for each well field would be the same as for the Proposed Action (Lages) well field. The water source for the wells outside the Lages Station well field would be private water rights in Steptoe Valley diverted to the new location, White Pine water rights permitted for power generation (should they become available for use by the Proponents) or a combination of both.

Middle Well Field Alternative

If available for use by the Proponents, this alternative would involve pumping 8,000 AFY from eight White Pine County permitted points of diversion in the middle portion of Steptoe Valley that would be relocated to align with the water pipeline identified for the EEC project (**Figure 2.2-2**). The description of the water wells and booster pump station for each well field would be the same as for the Proposed Action (Lages) well field. The water source for these wells would be private water rights in Steptoe Valley diverted to these well fields, The White Pine County water rights associated with those points of diversion (should they be available for use by the Proponents) or a combination of both.

South Well Field Alternative

If available for use by the Proponents, this alternative would involve pumping 8,000 AFY from eight permitted White Pine County points of diversion in the southern portion of Steptoe Valley

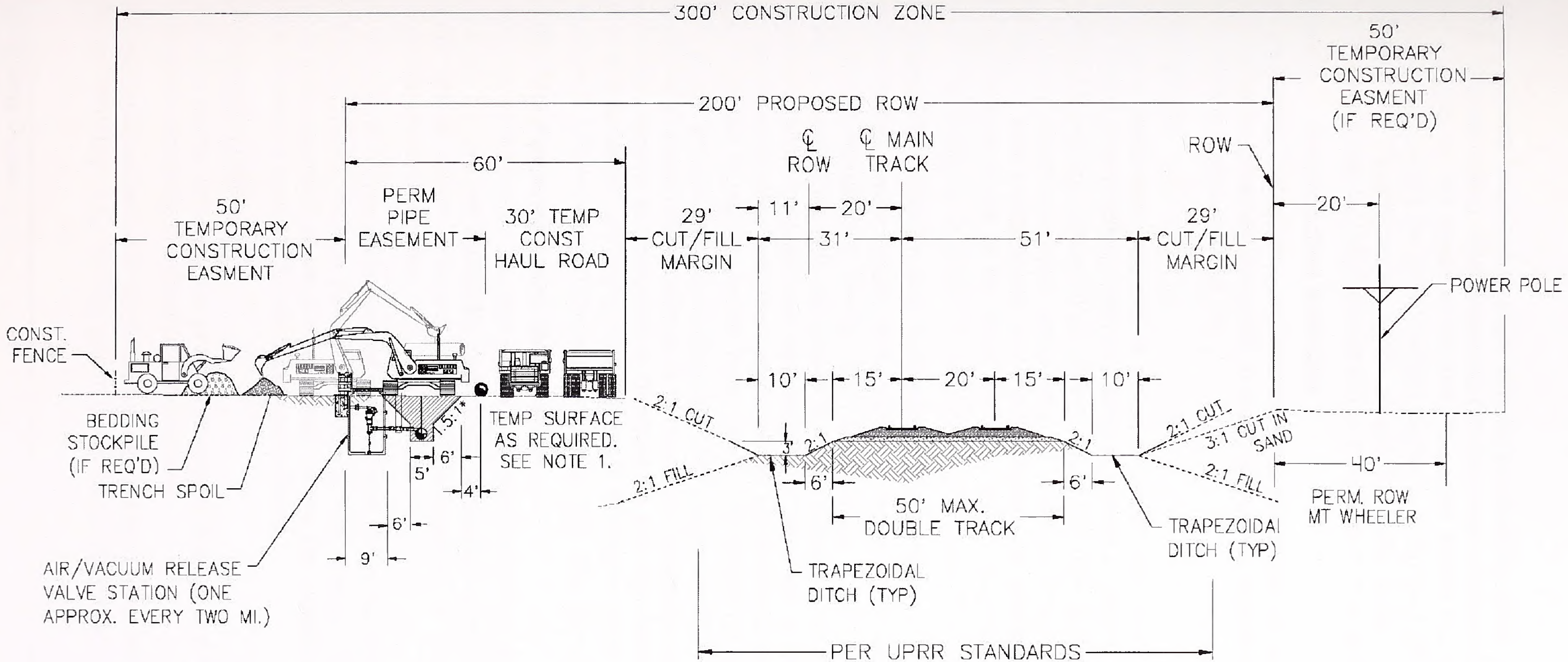


NOTES:

1. SURFACE TEMPORARY CONSTRUCTION ROAD AS REQUIRED. UPON COMPLETION OF CONSTRUCTION, CONSTRUCT 20' PERMANENT ACCESS ROAD W/ GRAVEL SURFACE CENTERED IN 20' ACCESS ROADWAY. RESTORE REMAINING 15'.
2. TEMPORARY STORAGE YARD TO BE PLACED APPROXIMATELY EVERY FIVE MILES, AS NEEDED.
3. WATER TANK FOR DUST CONTROL TO BE RELOCATED ALONG CORRIDOR AS NEEDED.
4. TEMPORARY CONSTRUCTION OPERATIONS AREAS SHALL BE RESTORED UPON COMPETION OF CONSTRUCTION.

MODIFED 2/25/08— HDR ENGINEERING

FIGURE 2.2-6
WATER PIPELINE AND
MT. WHEELER POWER LINE LAYOUT
ELY ENERGY CENTER



PIPELINE PARALLEL TO RAILROAD

N.T.S.

NOTES:

1. SURFACE TEMPORARY CONSTRUCTION ROAD AS REQUIRED. UPON COMPLETION OF CONSTRUCTION, CONSTRUCT 20' PERMANENT ACCESS ROAD W/ GRAVEL SURFACE CENTERED IN 20' ACCESS ROADWAY. RESTORE REMAINING 10'.

MODIFED 3/11/08 — HDR ENGINEERING

FIGURE 2.2-7
WATER PIPELINE AND MT. WHEELER POWER LINE LAYOUT ADJACENT TO RAILROAD
ELY ENERY CENTER

that would be relocated to align with the pipeline identified for the Proposed Action (Lages) well field (**Figure 2.2-2**). The description of the water wells and booster pump station for each well field would be the same as for the Proposed Action (Lages) well field. The water source for these wells would be private water rights in Steptoe Valley diverted to these well fields, the White Pine County water rights associated with those points of diversion (should they be available for use by the Proponents) or a combination of both.

2.2.3.2 Construction Activities

Construction, operations, and maintenance of the raw groundwater supply and delivery system would follow generally accepted industry standards including, but not limited to, American Water Works Association and ASTM.

Well Fields

At each production well site, a borehole would be drilled using a closed system of reverse-circulation rotary-drilling method. Using this closed system, all drilling fluids would be controlled within the drilling system. Well casing, filter pack, and well screens would be installed inside the completed borehole. Upon completion of well construction, each well would be subjected to a battery of well performance and aquifer tests. The entire testing sequence is expected to last approximately three to ten days for each well. The groundwater produced during well testing would be disposed or stored in compliance with all applicable regulations.

Electric Transmission and Communication Lines

Transmission power would be required for each water alternative to operate the pumps and associated equipment. Design and construction of the overhead transmission line would be done in accordance with standards and specifications of Mt. Wheeler. The overhead line would generally follow the alignment established for the water pipelines as previously described. Holes would be excavated and then poles would be delivered and assembled at each pole location and installed in the excavated hole. Each pole would be backfilled and compacted with either native soil or concrete depending on existing soil conditions. Guy wires and anchors would be installed at some pole locations as necessary. The conductor and shield wire would be strung in a similar manner as described in **Section 2.2.2.2**. Communication lines would be strung on the pole line or placed underground adjacent to the water pipeline to provide for remote operation of each well. Wireless communication systems may also be used.

ROW Site Preparation and Mobilization

Prior to construction, several pre-construction activities would be completed. These activities include, but are not limited to, verification of pipeline alignment, continued coordination with the BLM and/or other affected interests, acquisition of permits, finalization of design, and procurement of materials.

A short-term construction yard or staging area would be required at the Lages Station well field. Other locations may be determined during final design. Additional construction staging areas would be required at various locations along the pipeline routes, but would be situated on private land or confined to the approved ROWs.

<u>Construction Utilities</u>

Existing power facilities are present at Lages Station and may need upgrades. No utility lines would be necessary for pipeline construction.

Construction water wells would be permitted through the Nevada State Engineer's Office. Water for construction (i.e., 10,000 gallon water tank and drilled water well) would be required within

10 miles of active construction locations. Several construction water wells and tanks may be needed along the alignment of the waterline. These water tanks and wells would be located outside of the waterline construction ROW. Existing wells would be utilized where possible. It is possible that up to five construction water wells would have to be drilled in various areas along the ROW (depending on the final alignment). These wells would likely need to pump 150 gpm to a storage tank. The water trucks would fill their tanks from the storage tank for construction water (wetting material, dust control) purposes.

Portable sanitary facilities would be provided for construction workers.

Mineral Material Borrow Areas

Borrow material is expected to be obtained from within the pipeline ROW. No new off-site borrow areas are expected to be opened by the Proponents or their contractors. If bedding material is needed, it would be mined on site or screened out of the excavation spoils. Backfill material would likely be screened on site and compacted into the trench. Material not able to be obtained from the ROW would be purchased from private existing vendor sites and then transported to the ROW.

Access Roads

Existing access roads that can be utilized for the construction of the waterline would be used to the extent possible. In some areas existing dirt roads would require widening or other improvements to accommodate the construction equipment. The Proponents would coordinate with responsible agencies and property owners to acquire approvals (e.g. short term rights-of-way) to use and, in some cases, to improve these access roads. New access roads are not anticipated, but may have to be built to facilitate the construction of the waterline. An all-weather (graveled) maintenance road would be constructed along the entire ROW, and when possible would tie into existing roads that may be present. The road would be maintained throughout the construction project by the Proponents' contractor. The road would be watered for dust control and repaired when necessary with heavy equipment available on site. Temporary roads that are created during construction would be evaluated to determine whether the roads are to remain permanently and undergo necessary repairs, or be restored to their natural state.

Site Clearing and Grading

Vegetation would be cleared and the construction ROW would be graded only to the extent necessary to provide safe and efficient operation of construction equipment. Vegetation within the ROW would be cut or scraped at or near the ground level. Except for the area to be excavated for the trench, the vegetative root system and subsurface soils would be left intact to the greatest extent practicable. This would help stabilize the soils within the ROW during construction. The ROW boundaries would be clearly staked or flagged and no disturbance would be allowed beyond the limits. The construction area would be graded using bulldozers to create a suitable work surface for construction vehicles.

Clearing, grading, or other construction activities would not be conducted when the soil in the ROW or access roads is too wet to adequately support construction equipment. If construction equipment creates excessively deep ruts, support of equipment would be deemed inadequate and construction activities would be suspended until soil conditions improve, an alternate route can be used, or conditions are mitigated such that construction activities can continue.

Fences crossing the right-of-way would be braced, cut, and fitted with a gate to permit controlled passage. During construction, the opening would be controlled as needed to prevent undesired

passage. Upon completion of construction activities, existing fencing would be replaced, braces left in place, and gates permanently installed.

Excavation

Excavation of the pipeline trench would be accomplished using machinery such as a tracked excavator or trenching machine. Spoil material and topsoil salvaged from the excavation would be temporarily stored on-site. To the extent possible, the excavated material would be used as trench backfill.

Blasting may be needed to remove unexpected rock during trench excavation. If rock formations were encountered and blasting was necessary, all required authorizations would be obtained and safety precautions observed. All blasting would be conducted in compliance with federal, state, and local laws, regulations, and policies. Normally, the effects of blasting would be confined to the pipeline construction ROW. After blasting has been completed, backhoes would be used to clean the trench for pipe installation.

Pipeline Installation and Testing

Where possible, the water pipeline would be installed in a trench approximately 4 to 5 feet deep, adjacent to any existing roads, near the edge of the roadway, but beyond the roadway drainage area. In general, pipeline installation can be accomplished at a rate of 140 to 600 feet per day depending on the site conditions.

Side-boom tractors and/or cranes would be used to lift, position, and lower the pipe into place. After the joints are assembled and tested, the pipeline and trench would be inspected to verify proper line, grade, minimum cover, that the trench is free of large rock or debris, external pipe coating is not damaged, and the pipe is properly fitted and installed. Additional bedding material would then be added to the trench and previously excavated materials would be pushed back and compacted into the trench using bladed equipment or backhoes.

Following installation, hydrostatic testing would be conducted to verify the integrity of the pipeline. The primary source of water for hydrostatic testing of the pipeline would be from the production wells. System test water would be discharged at the well fields with energy dissipaters at the pipe outlets to reduce soil erosion.

Restoration

After successful testing, the ROW, short-term extra work areas, and other disturbed areas would be finish-graded and any remaining construction debris would be disposed of properly. Original land contours would be restored to conform to adjacent areas as near as practicable. Permanent erosion and sediment-control measures, including diversion terraces and revegetation would be installed at this time. Private and public property such as fences, gates, and/or roads disturbed by construction activities would be restored to original or better condition.

Workforce and Equipment Requirements

The construction workforce or manpower would be determined by the Proponents' contractor. It is estimated that there would be two dirt crews (four to five people per crew) and two pipe crews (about six to eight people per crew) on the job. Pipe crews generally consist of two excavators, one loader, three laborers, one whacker, and one pipe foreman. There may also be two to three engineers on-site, as well as security, traffic control crews (five to seven people), and trucking crews. It is assumed this workforce would find housing in Ely or McGill or be housed at the Proponents' worker village.

Construction equipment typically includes light- and heavy-duty trucks, graders, bulldozers, backhoes, front-end loaders, water trucks, and water pumps.

2.2.3.3 Operations, Maintenance, and Abandonment

Well operation would be primarily controlled via water level sensors in the intermediate storage reservoir(s) at the pumping station(s) and secondarily by water level in the raw water storage reservoir at the power plant. Wells and pump stations would receive routine maintenance checks and procedures in order to maximize pump and motor life and minimize operational issues. It may be necessary to occasionally remove a motor or pump for maintenance or replacement. Removal of pumps would require a crane or boom truck. Such operations can last for a few days to a few weeks.

Routine visual checks of the pipeline route would also include visual inspection of valves, vents, or blow-off stations. Checks would also be made of the operation of these pipeline appurtenances, which may result in minor discharges of clean water along the pipeline route. A minor discharge would consist of five minutes at a maximum leakage rate of approximately 500 gpm. Energy dissipaters would be located at these minor discharge points to reduce soil erosion. A temporary discharge permit would be requested from NDEP for flushing, hydro testing, and commissioning water. Major maintenance or repair activities which may involve significant releases of water would be scheduled and the appropriate agencies and organizations would be notified in advance.

Road maintenance following completion of construction would include restoration via grading and/or addition of gravel surfacing in the case of roads that would remain as permanent facilities, or removal and reclamation in the case of temporary roads that would not remain following completion of construction.

Workforce and Equipment Requirements

There would be a need for weekly inspections of the pumping stations and well pumps. The pipeline would receive monthly visual inspections. Inspection crews would be required. Graders would be needed for road maintenance. Various repairs may require the use of excavators, cranes, or boom trucks to remove or replace pipe, motors, and pumps. The number of workers required for water facilities maintenance would be approximately two part-time contracted employees.

Access and Traffic

Inspection crews would visit the wells and pumping stations weekly and the pipeline monthly to ensure they are in good operating condition and secure. Maintenance crews would visit less frequently for routine maintenance and repairs.

Permanent access along the length of the waterline would be provided by a two-track access road (the same road as used for construction but only 10 feet wide). Some maintenance of this road may be required during wet periods to mitigate muddy driving conditions.

Abandonment

Wells would be maintained in good working condition throughout the life of the project. If, during the life of the power plant, one or more wells are unable to reliably yield the needed water, such wells may be plugged and abandoned in accordance with applicable regulations. At the end of the plant's life, the Proponents would convey the water supply system to White Pine County and work with the Nevada State Water Engineer and BLM to complete this process. If for some reason this approach is not viable, then the wells would be plugged and abandoned in

accordance with applicable regulations. It is anticipated that the underground water pipeline facilities would be left in place if the water supply system were abandoned.

2.2.4 Rail Facilities

2.2.4.1 Upgrading of the Nevada Northern Railway

Originally built by the Nevada Consolidated Copper Company in 1905, the NNRy (Nevada Northern Railway) line extends approximately 150 miles from the historic town of Cobre (north of Shafter, near Wells, Nevada) to Ely, Nevada, intersecting the UPRR (Union Pacific Railroad), Shafter Subdivision (**Figure 2.2-1**). Most freight trains on the NNRy ceased in 1983 (see internet site http://nevadanorthernrailway.net/nnry_history.htm) though some ore transport occurred as recently as 1999 (NNRy Museum 2006). As a result, the rail line fell into disrepair. The City of Ely and the White Pine Historical Railroad Foundation jointly own the rail line and private ROW, and intend to upgrade the track to support economic development in the Ely area. The reconstruction of the NNRy is a project hosted by the City of Ely for reasons other than the Proposed Action and using funds from sources independent of the Proponents. The Proponents are supporting the City/Foundation in the reconstruction of the rail line under a Joint Development Agreement because (1) it may be more efficient from a cost and schedule standpoint for the Proponents to help with the upgrade of the NNRy than to build a separate and parallel alternative rail line, and (2) the resulting upgrade for the NNRy would benefit not only the Proponents but also the City of Ely and the general Steptoe Valley economy. It is not necessary for the upgrading of the privately owned NNRy to receive a ROW from the BLM; however, as outlined in the Programmatic Agreement, Section 106 consultation would be conducted. The NNRy has separate utility from the Proposed Action; and, this activity is planned to commence before the BLM decision on the EEC.

After the upgrading of the NNRy occurs, the Proponents would construct a new rail lead spur, approximately 1.5 miles long, off the NNRy and connect to a rail loop on the plant site (see **Figure 2.2-3**). The short-term construction ROW for the rail lead would be 300 feet wide with a long-term ROW of 200 feet wide.

The NNRy upgrade is mentioned here for informational purposes and no analysis for the upgrade activities and subsequent general operation of the rail line will be included in this EIS. Environmental impacts for the rail lead spurs connecting the NNRy and the Proposed Action and alternate plant site are evaluated in this EIS, as are the environmental effects of rail line operations directly in support of the EEC.

2.2.4.2 Alternative Rail Line

Elements and ROWs

If the NNRy were not upgraded (see **Section 2.2.5**), the Proponents would seek to obtain a ROW to construct a new railway across BLM administered lands that would roughly parallel the NNRy from the Union Pacific Railroad (UPRR) at Shafter and connect directly to the site via a rail lead, about 3 miles east of the existing alignment (**Figure 2.2-2**). This rail line would be privately owned and operated, serving the EEC exclusively. This Alternative Rail Line would cross BLM administered land and would need a ROW before construction could occur. This EIS evaluates the environmental effects of constructing this Alternative Rail Line to support a BLM decision on this project component if needed.

The Alternative Rail Line would be constructed consistent with current railroad industry standards for operation of unit coal trains and constructed with new 136 pound per yard continuously welded rail, new concrete ties spaced on 24 inch centers, and supported on 12

inches of crushed rock ballast. The track structure (rail, ties, and ballast) would be supported on a new railroad embankment to be constructed on a new alignment. This embankment would be 31 feet wide at the top and include a 6-inch thick layer of compacted gravel or subballast (**Figure 2.2-8**). The typical embankment would have 2:1 side slopes and 10 foot wide ditches.

The Alternative Rail Line route would begin at the existing Shafter yard facilities of the UPRR and parallel the NNRy line a distance of approximately 3 miles and then angle southeasterly across the Goshute Valley where it would follow the east side of the valley rounding the Dolly Varden Mountains. The existing railroad siding at Shafter would be upgraded by UPRR in accordance with their permitting authorization to accommodate coal traffic of the Proponent and increasing volumes of western coal traffic from the Powder River Basin. The existing siding would be lengthened to allow for the longer trains and additional track(s) constructed upon UPRR ROW to enhance western coal operations. Rail interchange with the UPRR is anticipated to be located at the existing West Wendover rail yard. The line would then transition to the Steptoe Valley and cross US-93 at-grade approximately midway between Lages Station and Currie. The line would continue along the east side of the Steptoe Valley west of and parallel to US-93 to the plant site.

The Alternative Rail Line would be constructed to current industry standards minimizing rail profile grades to a maximum of one percent while maintaining existing ground contour elevations to the extent possible. Both the Goshute and Steptoe valleys are relatively flat allowing for minimal profile grades between Shafter and the plant sites. The most challenging location is located within the Dolly Varden range where the line would climb to an elevation of 6,000 feet in the Currie Hills area before descending 100 feet in a distance of four miles where it would cross US-93 at-grade. The maximum depth of cut from top of proposed rail to existing ground is estimated between 25 and 30 feet and the maximum height of embankment fill is estimated at 20 to 25 feet. The embankment, ditches, and required slopes would all be constructed within the long-term 200-foot wide ROW.

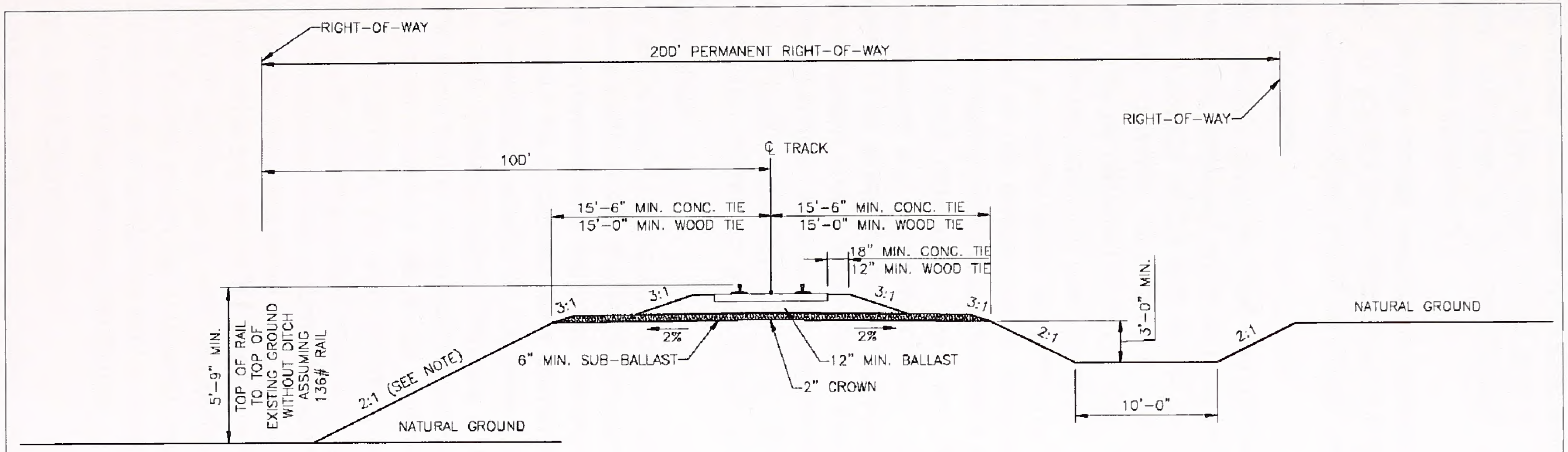
The ROW would generally not be fenced to allow free passage of wildlife and livestock across the rail line. Fencing may be installed in selected locations as required by land management agencies or adjacent landowners.

This ROW would also contain the proposed water pipeline from the Lages Station well field south to the plant site. If the rail and pipeline were constructed in the same ROW, a short-term construction ROW width of 300 feet and a long-term ROW of 200 feet would be shared by the rail line and pipeline from Lages Station to the South Plant Site. No pipeline would be required North of Lages Station, so no additional short-term construction ROW would be needed and all construction activities would occur within the 200-foot long-term ROW. Some sidings would be built parallel to the main line at select locations between EEC and Shafter. At Shafter, there would also be a new siding built within the UPRR ROW. The total length of the rail line would be approximately 100 miles long.

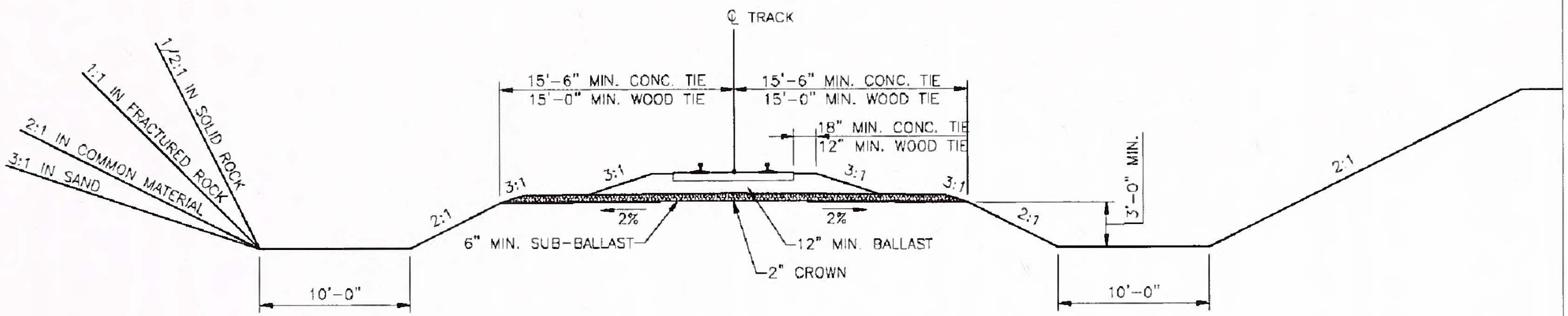
2.2.4.3 Construction Activities

ROW Site Preparation and Mobilization

Survey and staking of the proposed alignment would be completed. Geotechnical investigations would be accomplished in accordance with an investigation plan developed by the Proponents' geotechnical contractor.



TYPICAL ROADBED SECTIONS IN FILLS
(NOT TO SCALE)



TYPICAL ROADBED SECTIONS IN CUTS
(NOT TO SCALE)

NOTES:
1. MAIN TRACK TO BE CENTERED ON ROW UNLESS NOTED OTHERWISE.
2. SLOPES SHOWN FOR BANKS IN CUTS AND ON FILLS SHALL BE CONSIDERED STANDARD AND GENERALLY USED, BUT MAY BE MODIFIED AS REQUIRED BY LOCAL CONDITIONS AND CHARACTER OF MATERIAL.
3. WHERE SERVICE OR MAINTENANCE ROADWAY IS TO BE PROVIDED, ADD 9'-0" ADDITIONAL WIDTH TO THE ROADBED SECTION AT TOP OF SELECTED MATERIAL ELEVATION.
4. TOP OF BALLAST TO BE FLAT ACROSS AT 1" UNDER BOTTOM OF RAIL.
5. IN DEEP CUTS, INCLUDE A 10' WIDE BENCH EVERY 20' IN HEIGHT.

FIGURE 2.2-8
TYPICAL RAILWAY ROADBED SECTIONS
NORTH OF LAGES STATION
ELY ENERGY CENTER

single location, temporary buildings consisting of construction trailers and small metal or wood structures would be erected to house offices and storage for construction activities. This site would be accessible from US-93 and is expected to be located at Lages Station. The only permanent buildings to be constructed along the rail line would be to house signal and communication equipment.

Material storage areas would be constructed with appropriate spill containment and other measures to control any hazardous substances. Material storage areas may be open-air or covered. Covered areas would be metal buildings with or without floors as necessary.

Railroad Structures

Hydraulic design requires that the railroad embankment be designed to effectively allow stormwater and snowmelt water to pass beneath the track with minimal backing up of this water. This cross drainage of the line would be handled primarily with round pipe culverts or square concrete box culverts. At locations with high volumes of storm water, bridges, or railroad structures, may be required in lieu of pipe or box culverts. Bridges, if required, would be built out of steel or precast concrete beam sections and supported on steel or concrete piling. The length of the bridge would be governed primarily by the drainage requirements and to a lesser extent by the height of the embankment. Bridges would be constructed to industry standard with a Cooper E80 loading design and include a pan, or bridge deck, that holds the rock ballast and a conventional track structure. These are referred to as "ballast deck" bridges. Bridges would include walkways and handrails on both sides of the track for safety of railroad personnel and trespassers. Two areas of particular concern that are likely to require bridges are the Duck Creek and Nelson Creek watersheds. Any construction or filling in jurisdictional Waters of the United States would be done in compliance with permits obtained from the U.S. Army Corps of Engineers, if applicable. Appropriate erosion control measures would be implemented to control storm runoff into streams or streambeds (see **Appendix 2A**, **Best Management Practices**).

Road Crossings

The Alternative Rail Line would cross a number of public and private roadways. The intersection of a roadway surface with the track structure creates an at-grade crossing. All existing roadways would be maintained and the zone immediately over the track structure (estimated total width of 10 feet) would be improved with prefabricated concrete or timber crossing surface material. Roadway elevations would be adjusted in accordance with The American Association of State Highway and Transportation Officials (AASHTO) standards to provide a smooth transition across the track that is designed in accordance with both the type and speed of the roadway. All public at-grade crossings would be reviewed by NDOT and the Public Utilities Commission of Nevada to determine the appropriate type of warning devices that would be installed. At a minimum, each crossing would have a "Railroad Crossing" or X-buck sign. If traffic warrants the inclusion of train-activated automatic flashing light signals or automatic flashing light signals with roadway gates, they would be installed as part of the project and maintained by the operator of the rail line. All work would be done to maintain vehicular traffic or under an approved traffic control plan from the party with jurisdiction over the roadway. It is anticipated that the US-93 crossing at Currie would be detoured immediately to the north on a temporary bypass. This would be done in accordance with a permit from NDOT. Only those crossings which currently appear to be used would be maintained.

Tracks and Yard Construction

Once grading is complete, sub-ballast, ballast, and railroad tracks would be installed along the railroad alignment. Construction of these facilities would require dump trucks, cranes and

specialty railroad installation equipment. Once enough railroad track is constructed and in place, material may be brought in on the new railroad.

Workforce and Equipment Requirements

It is expected that during the construction of the Alternative Rail Line, a minimum of 60 workers could be working during daylight hours. Depending upon time constraints and the contractor's work plan, the workforce could be increased. These would likely be spread out into two or more crews. It is assumed this workforce would be housed at the Proponents' worker village or find housing in Ely or McGill.

Equipment required for constructing culverts and other structures would include: cranes, excavators, drilling equipment, water trucks, dump trucks, concrete trucks, and other material handling trucks.

Specific equipment and vehicles have not been determined but there would be no unusual construction equipment used. Large equipment required for track laying and installation of ballast would come via existing rail lines or delivered in sections by truck and assembled on-site.

2.2.4.4 Operations, Maintenance, and Abandonment

The Alternative Rail Line would be utilized for deliveries of coal, other bulk materials, and equipment to the power plant. Coal trains would enter from the rail line onto the rail lead connecting to the plant site and continue onto the rail loop in the plant site. The rail line would be operated and maintained in accordance with Federal laws, and applicable State and local regulations.

Track inspections and other routine maintenance functions would be completed using a variety of vehicles including Hi-rail vehicles. Hi-rail vehicles are highway legal vehicles that are specially equipped with railroad guide wheels that allow them to operate on either the roadway or track. These vehicles are set-on or removed from the track at either roadway crossings or Hi-rail set-off pads that would be constructed entirely upon the railroad ROW. Road crossings would be used whenever possible, in lieu of Hi-rail set off pads wherever crossing spacing is suitable. Heavy track structure maintenance (track lining, ballast cleaning, surfacing-leveling) would require the use of permanent rail-mounted equipment. Vegetation along the track would be controlled to comply with Federal safety requirements, to minimize fire safety hazards, and to maintain a clean and well-drained track section. Hydraulic control structures, such as culverts and bridges, would periodically be inspected and cleared of sediment, trash and other debris to assure that they are functioning properly.

Workforce and Equipment Requirements

Operations and maintenance work crews would be expected to work along the Alternative Rail Line at any given time. At the plant site, as many as 20 railroad workers per shift may be on-site performing inspections, servicing locomotives and rail cars, and maintaining rail and rail related facilities. There are likely to be two to three 8-hour shifts working 7 days per week at the plant site.

Access and Traffic

EEC traffic on the Alternative Rail Line would be limited to train traffic for EEC operations including but not limited to coal shipments and fly ash disposal, and occasional vehicular traffic to inspect and maintain the rail spur. Trains would be limited to a maximum speed of 45 mph. Assuming normal operations; coal trains are anticipated to be 135-car (nominal) with future

expansion to 150-car trains. This translates to 427, 135-car trains or 384, 150-car trains each year.

A permanent access road approximately 12 feet wide would be installed along the Alternative Rail Line within the long-term ROW to allow for maintenance activities.

Abandonment

At the end of the power plant's life, the Alternative Rail Line and rail lead could still provide value to the power plant site for a future industrial use.

2.2.5 Environmental Protection Measures and Best Management Practices

Activities under the Proposed Action and Action Alternatives would include environmental protection measures that are an integral part of the Proposed Action. These measures follow BMPs established by the BLM for the construction, operation, and maintenance of power plants, well fields, pipelines, electric transmission facilities, rail lines, and other related facilities in this region (**Appendix 2A, Best Management Practices**). These BMPs would be followed to avoid or minimize the potential for adverse environmental effects resulting from project-related activities.

Best Management Practices are described for the following activities:

- Air pollution prevention
- Landscape preservation and impact avoidance
- Erosion and sediment control
- Pipeline and utility construction
- Biological resources
- Cultural resources
- Paleontological resources
- Noxious and invasive weed management
- Reclamation (site restoration, revegetation)
- Visual resources
- Water pollution prevention and monitoring
- Noise prevention
- Hazardous material storage, handling, and disposal, and safety measures
- Socioeconomics

The COM Plan would detail the methods and procedures to be used in the construction of the power plant, electric transmission facilities, water supply system, rail spur, access roads, and ancillary facilities. The COM Plan would incorporate site-specific stipulations, terms, and conditions in order to satisfy all EEC plant construction requirements, as well as operational, maintenance, and abandonment/restoration requirements associated with lands administered by the Ely Elko, and Southern Nevada District Offices of the BLM where project features would be located.

Resource-specific mitigation measures are described in Chapter 4, Environmental Consequences.

2.2.6 Proposed Action Summary

Table 2.2-3 summarizes the estimated acres of disturbance (short-term, reclaimed, and long-term) for the Proposed Action, including short-term and long-term ROW acreage requirements.

TABLE 2.2-3. ESTIMATED ACRES OF ROWS, DISTURBANCE, AND RECLAIMED AREAS

PROJECT ELEMENTS	BLM ROWs		DISTURBED AND RECLAIMED AREAS		
	SHORT-TERM	LONG-TERM	SHORT-TERM	RECLAIMED	LONG-TERM
South Plant Site, Includes Switchyard and Substation Alternative					
Disposal Area[1]	0	2,477	2,477	0	2,477
ROW	0	493	493	0	493
South Site Worker Village[2]	12	12	162	162	0
Mt. Wheeler Power Lines	47	47	113	95	18
Electric Transmission Facilities					
Robinson Summit Substation, includes 50-ft wide access road	82	82	82	0	82
Segment 4A (Lines 1 & 2)	348	632	348	334	14
Segment 1D (Lines 1 & 2)	682	988	682	558	124
Segment 1E (Lines 1 & 2)	14	24	14	8	6
ALT – Segment 3 (Lines 1 & 2)	438	502	438	424	14
Segment 6A (Lines 1 & 2)	14	24	14	8	6
Segment 1G (Lines 1 & 2)	20	30	20	18	2
Segment 6C (Lines 1 & 2)	4,056	4,962	4,056	3,490	566
Segment 8 (Lines 1 & 2)	1,548	2,708	1,548	1,492	56
Segment 9A (Line 1)	128	196	128	96	32
ALT – Segment 9A (Lines 1 & 2)[3]	256	392	256	193	63
Segment 9B (Lines 1 & 2)	336	526	336	326	10
Segment 9C (Line 2)	115	160	115	91	24
Segment 9D (Lines 1 & 2)	610	938	610	530	80
Segment 11 (Lines 1 & 2)	1,110	1,870	1,110	1,054	56
ALT – Segment 10 (Line 2)	657	1,114	657	572	85
Other Transmission Line Components (e.g. Fiber Optic Regeneration Sites and Electric Power Service, Material/Construction Yards)	420	70	420	350	70
Harry Allen Substation Expansion	47	10	47	30	10
Water Supply Facilities					
Lages Station Water Supply Line[4]	1,038	311	1,043	730	313
Lages Station Well Field & Pipeline[5]	N/A	N/A	158	104	54
ALT – Duck Creek Impoundment/Pipeline[6]	134	40	134	94	40
ALT – Reduced Lages w/Coyote Valley Ranch (includes Coyote Valley Ranch Well Field and Water Line)[7]	8	3	30	15	15

PROJECT ELEMENTS	BLM ROWs		DISTURBED AND RECLAIMED AREAS		
	SHORT-TERM	LONG-TERM	SHORT-TERM	RECLAIMED	LONG-TERM
ALT – Reduced Lages w/Limited South Well Field	Same as Lages Station Well Field and Water Supply Pipeline				
ALT – Middle Well Field	725	217	725	508	217
ALT – South Well Field	191	58	191	133	58
Rail Line Facilities					
South Plant Site Rail Lead	55	36	55	19	36
Alternative Rail Line (with water line)	2,910	2,397	2,964	513	2,451
Alternative Rail Line (without water line)	2,397	2,397	2,451	0	2,451

[1] This acreage would eventually be disposed of/sold to the Proponents.
[2] A BLM ROW would only be required for the access road as the worker village would be situated on private land.
[3] Segment 9C (Line 2) would not be used in this alternative
[4] Includes up to nine pipeline material yards within 200-foot construction ROW.
[5] A BLM ROW would not be required, as the Well Field and Pipeline would be situated on private land; assumes 200 ft. short-term and 60 ft. long-term disturbance width, and 10 acres of pumping station and reservoir disturbance.
[6] Portions would occur on private land or within county road ROW.
[7] Values in addition to the Lages Station Water Supply. The Well Field and the majority of the water pipeline would be situated on private land.

2.3 North Plant Site Alternative

2.3.1 Plant Site

2.3.1.1 Elements and ROWs

Power Plant Facilities

The North Plant Site Alternative would be located approximately 50 miles north of Ely, Nevada to the west of US-93 (**Figures 2.3-1** and **2.3-2**). The plant site itself would be similar to the Proposed Action in most respects, except a few minor changes to the site layout (**Figure 2.3-3**). The plant site would still be approximately 3,000 acres total, comprised of a 500-acre ROW and 2,500 acres disposed by the BLM. The Phase 1 power plant components would essentially be the same for the North Plant Site and for the South Plant Site, as would the Phase 2 power plant.

Coal Unloading, Storage, and Handling

Coal unloading, storage and handling facilities would be the same as described under the Proposed Action (**Section 2.2.1.1**).

Combustion By-products and Wastewater Handling

Combustion by-products and wastewater handling facilities would be the same as described under the Proposed Action (**Section 2.2.1.1**).

EEC Switchyard

As described under the Proposed Action, a 500-kV switchyard would be constructed adjacent to the North Plant Site within the ROW. The switchyard would be part of the overall plant site. The purpose of this switchyard would be to transfer the electricity generated by the power plant to

the electric transmission system via the Robinson Summit Substation (**Section 2.2.2.1**). Two 500-kV transmission lines would lead from this switchyard west to the SWIP Corridor and then south (**Figure 2.3-1**).

Construction Worker Village

As under the Proposed Action, the Proponents plan to construct a worker village of approximately 150 acres on private land (**Figures 2.3-1** and **2.3-2**).

Mount Wheeler Power Line

Mt. Wheeler's proposal to provide a reliable source of power as described for the Proposed Action would still be applicable for construction activities at the North Plant Site, power for the worker village, and power for the water supply facilities (i.e. well fields and pump stations).

2.3.1.2 Construction Activities

The general pre-construction and construction activities, workforce, and equipment used for the North Plant Site would be the same as those for the Proposed Action.

2.3.1.3 Operations, Maintenance, and Abandonment

Operations and maintenance activities, workforce requirements, and equipment needed for the North Plant Site would be the same as those for the Proposed Action. Abandonment procedures would also be the same as the Proposed Action.

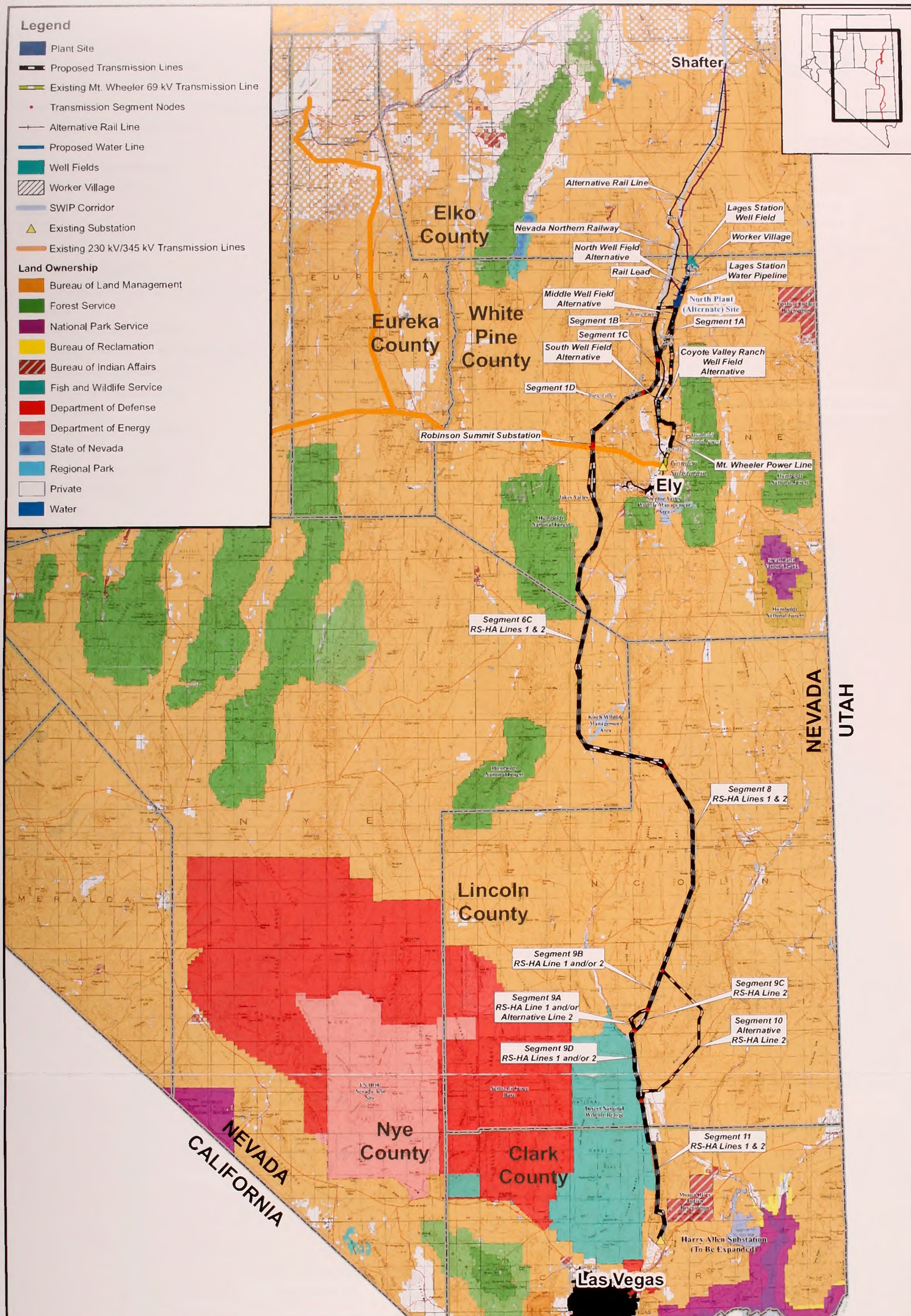
2.3.2 Electric Transmission Facilities

2.3.2.1 Elements and ROWs

Table 2.3-1 provides a description of each transmission line segment for a better understanding of the transmission line segment naming and proposed phased construction for the North Plant Site.

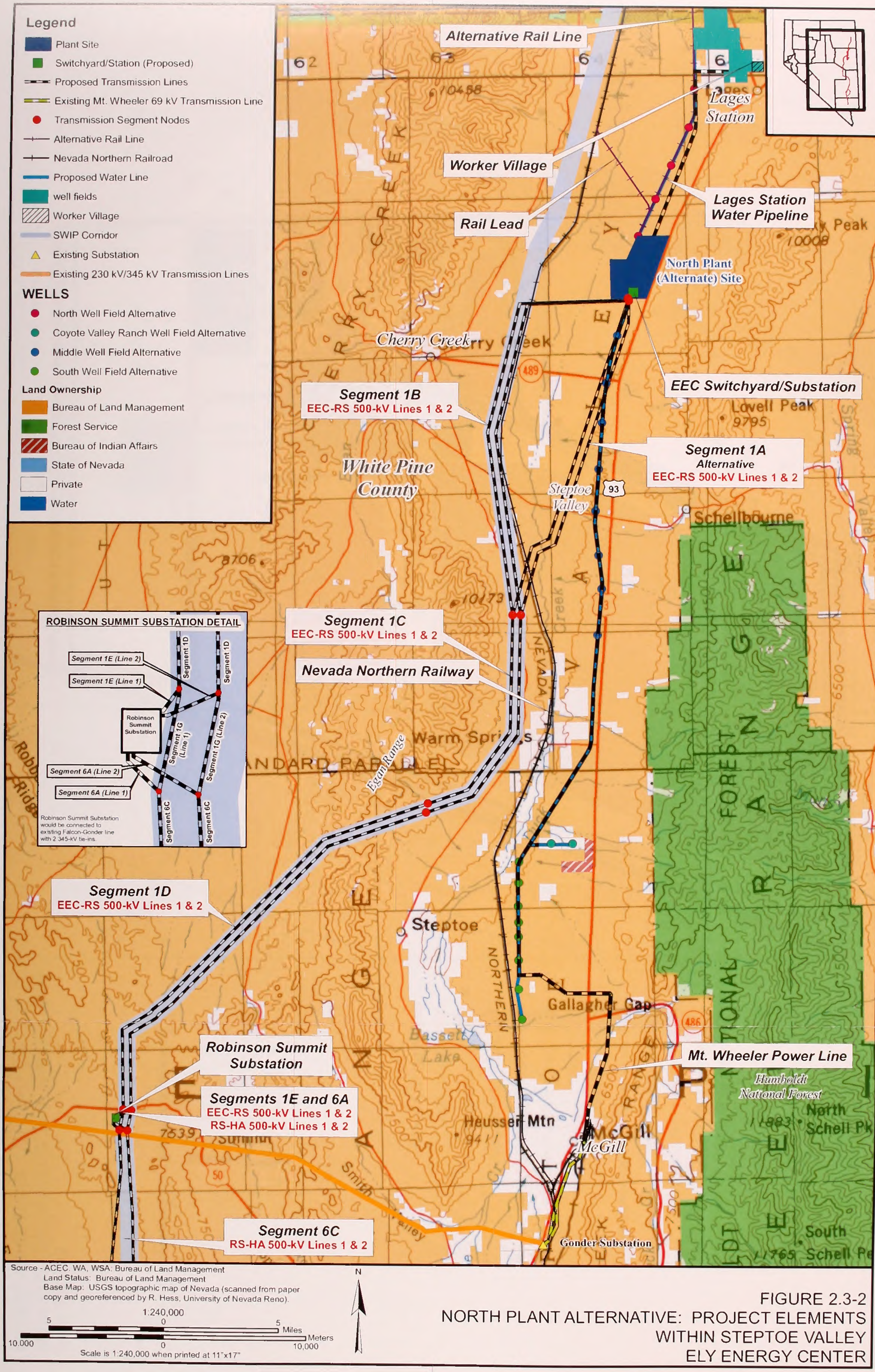
TABLE 2.3-1. TRANSMISSION LINE SEGMENT NAMING CONVENTION

LINE NAME	DESCRIPTION	SEGMENTS INCLUDED
EEC-RS #1 Line	500-kV transmission line from EEC (North Plant Site) leading to the Robinson Summit Substation. This line would facilitate early testing of the plant.	1B, 1C, 1D, 1E 1A (alternative)
EEC-RS #2 Line	500-kV transmission line from EEC (North Plant Site) leading to the Robinson Summit Substation. This line would be built prior to commercial operation of the plant.	1B, 1C, 1D, 1E 1A (alternative)
RS-HA #1 Line	500-kV transmission line from Robinson Summit Substation leading to the Harry Allen Substation. Constructed for Phase 1 of the project.	6A, 6C, 8, 9B, 9A, 9D, and 11
RS-HA #2 Line	500-kV transmission line from Robinson Summit Substation leading to the Harry Allen Substation. Constructed for Phase 2 of the project.	6A, 6C, 8, 9B, 9C, 9D, and 11 10 (alternative)



Source - Land Ownership: Bureau of Land Management
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno).

FIGURE 2.3-1
NORTH PLANT SITE ALTERNATIVE: PROJECT ELEMENTS
ELY ENERGY CENTER



Source - ACEC, WA, WSA: Bureau of Land Management
Land Status: Bureau of Land Management
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno).

FIGURE 2.3-2
NORTH PLANT ALTERNATIVE: PROJECT ELEMENTS WITHIN STEPTOE VALLEY
ELY ENERGY CENTER

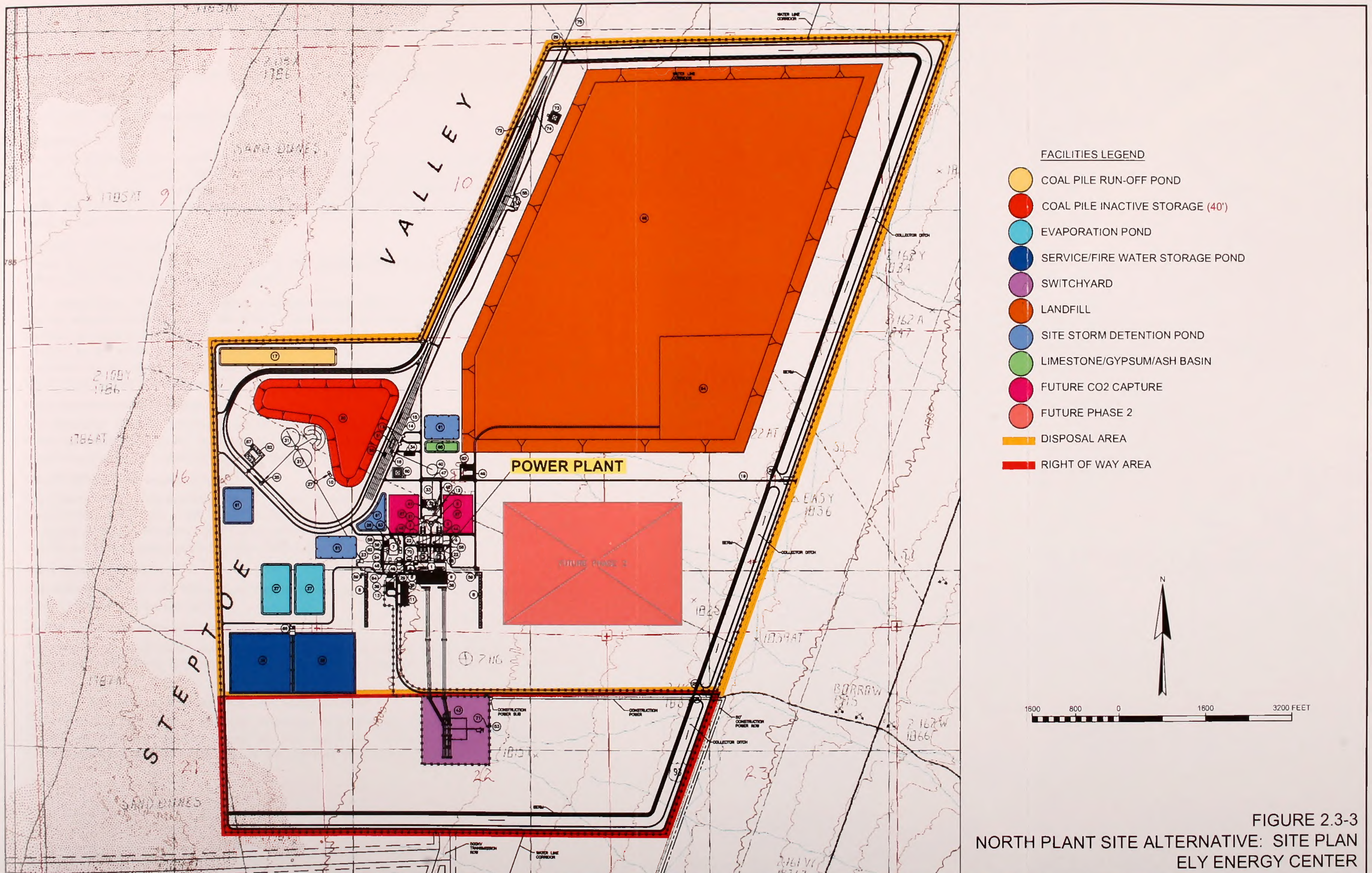


FIGURE 2.3-3
NORTH PLANT SITE ALTERNATIVE: SITE PLAN
ELY ENERGY CENTER

EEC 500-kV Switchyard

The switchyard at the North Plant Site would be constructed as described under the Proposed Action (**Section 2.2.2.1**).

500-kV EEC-RS Transmission Lines

Segment 1

The EEC-RS lines #1 & 2 would be constructed from the North Plant Site switchyard west to the SWIP Corridor and south to the Robinson Summit Substation as part of Phase 1 (see **Figures 2.3-1** and **2.3-2**). This route would include Segments 1B and 1C in addition to the segments that follow the SWIP Corridor previously identified under the Proposed Action (approximately 49 miles for both Lines 1 and 2).

Segment 1A Alternative

Under this alternative, the two new 500-kV transmission lines would not extend west to the SWIP Corridor and follow Segment 1B south.

The transmission lines would extend southwest along Segment 1A (**Figure 2.3-2**) to avoid private property located within the SWIP Corridor along Segment 1B. Segment 1A would connect to Segment 1C further to the south and would continue within the existing SWIP Corridor to the Robinson Summit Substation as discussed under the Proposed Action. This alternative would have a net distance reduction of approximately 4 miles each for EEC-RS Lines 1 and 2, as compared to Segment 1.

Robinson Summit Substation

The Robinson Summit Substation would be constructed as discussed under the Proposed Action (**Section 2.2.2.1**) and the existing Falcon – Gonder 345-kV transmission line would be looped approximately 1 mile into the Robinson Summit Substation.

500-kV RS-HA Transmission Lines

The 500-kV RS-HA transmission lines 1 (Phase 1) and 2 (Phase 2) would leave the Robinson Summit Substation and head south to the Harry Allen Substation as discussed under the Proposed Action in **Section 2.2.2.1**. The same two SWIP Corridor alternatives (Segments 9A and 10) would also apply under the North Plant Site Alternative.

Harry Allen Substation

The existing ROW for the Harry Allen Substation would be expanded as discussed in **Section 2.2.2.1** under the Proposed Action.

2.3.2.2 Construction Activities

The general pre-construction and construction activities, workforce, and equipment used for the switchyard, substations, and transmission lines would be the same as those for the Proposed Action.

2.3.2.3 Operations, Maintenance, and Abandonment

Operations and maintenance activities, workforce requirements, and equipment needed for the electric transmission system would be the same as those for the Proposed Action. Abandonment procedures would also be the same as the Proposed Action.

2.3.3 Water Supply Facilities

2.3.3.1 Elements and ROWs

Lages Station Well Field

The Lages Station Well Field would be the same as described under the Proposed Action (**Section 2.2.3.1**). The waterline would run from the well field south to the North Plant Site (approximately 7 miles).

Reduced Lages Station with Coyote Valley Ranch Well Field Alternative

This water supply alternative would be the same as for the Proposed Action, except the waterline would extend to the North Plant Site.

North Well Field Alternative

If available for use by the Proponents, this particular alternative would involve pumping 8,000 AFY from five White Pine County permitted points of diversion in the northern portion of Steptoe Valley that would be relocated to align with the water pipeline identified for the EEC project (**Figure 2.3-2**). The water source for these wells would be private water rights in Steptoe Valley diverted to these well fields, the White Pine County water rights associated with those points of diversion (should they be available for use by the Proponents) or a combination of both.

Middle Well Field Alternative

This Middle Well Field water supply alternative would be the same as for the Proposed Action, except the waterline would extend to the North Plant Site.

South Well Field Alternative

The South Well Field water supply alternative would be the same as for the Proposed Action, except the waterline would extend to the North Plant Site.

2.3.3.2 Construction Activities

The general pre-construction and construction activities, workforce, and equipment used for wells, substations, and transmission lines would be the same as those for the Proposed Action.

2.3.3.3 Operations, Maintenance, and Abandonment

Operations and maintenance activities, workforce requirements, and equipment needed for the water supply system would be the same as those for the Proposed Action. Abandonment procedures would also be the same as the Proposed Action.

2.3.4 Rail Facilities

2.3.4.1 Upgrading of Nevada Northern Railway

The NNRy would be upgraded and reconstructed as described under **Section 2.2.4** of the Proposed Action, except that the NNRy would extend 65 miles to the North Plant Site (**Figures 2.3-1** and **2.3-2**).

After the upgrading of the NNRy occurs, the Proponents would construct a new rail lead, approximately 5.5 miles long, off the NNRy and connect to a rail loop on the North Plant Site (see **Figure 2.3-2**).

2.3.4.2 Alternative Rail Line

Elements and ROWs

If the NNRy were not upgraded or otherwise unavailable for use, the Proponents would seek to obtain a ROW to construct a new railway that would roughly parallel the NNRy from the UPRR

at Shafter and connect directly to the site via a rail lead, about 3 miles east of the existing alignment (**Figures 2.3-1** and **2.3-2**). This railway would be privately built and operated with the sole intent of servicing the EEC. This Alternative Rail Line would be located across BLM administered land and would require a ROW from the BLM before construction could occur. This EIS will evaluate the environmental effects of constructing this Alternative Rail Line to support a BLM decision on this project component if needed.

Construction Activities

The general pre-construction and construction activities, workforce, and equipment used for the rehabilitation or construction of a rail line, siding and lead, and associated facilities would be the same as those for the Proposed Action.

Operations, Maintenance, and Abandonment

Operations and maintenance activities, workforce requirements, and equipment needed for the rail line would be the same as those for the Proposed Action. Abandonment procedures would also be the same as the Proposed Action.

2.3.5 Environmental Protection Measures and Best Management Practices

BMPs associated with the North Plant Site Alternative would be the same as described for the Proposed Action in **Section 2.2.5**, and contained in **Appendix 2A: Best Management Practices**. Resource-specific mitigation measures are described in Chapter 4, Environmental Consequences.

2.3.6 North Plant Site Alternative Summary

Table 2.3-2 summarizes the estimated acres of disturbance (short-term, reclaimed, and long-term) for the North Plant Site Alternative, including short-term and long-term ROW acreage requirements.

TABLE 2.3-2. ESTIMATED ACRES OF ROWS, DISTURBANCE, AND RECLAIMED AREAS

PROJECT ELEMENTS	ROWS		DISTURBED AND RECLAIMED AREAS		
	SHORT-TERM	LONG-TERM	SHORT-TERM	RECLAIMED	LONG-TERM
North Plant Site, Includes Switchyard					
Disposal Area[1]	0	2,479	2,479	0	2,479
ROW	0	493	493	0	493
North Site Worker Village[2]	N/A	N/A	150	150	0
Mt. Wheeler Power Line	47	47	113	95	18
Electric Transmission Facilities					
Robinson Summit Substation, includes 50-ft wide access road	82	82	82	0	82
ALT: Segment 1A (Lines 1 & 2)	420	720	720	406	14
Segment 1B (Lines 1 & 2)	428	900	428	410	18
Segment 1C (Lines 1 & 2)	332	484	332	312	20
Segment 1D (Lines 1 & 2)	682	988	682	558	124
Segment 1E (Lines 1 & 2)	14	24	14	8	6
Segment 6A (Lines 1 & 2)	14	24	14	8	6
Segment 6C (Lines 1 & 2)	4,056	4,962	4,056	3,490	566
Segment 8 (Lines 1 & 2)	1,548	2,708	1,548	1,492	56

PROJECT ELEMENTS	ROWS		DISTURBED AND RECLAIMED AREAS		
	SHORT-TERM	LONG-TERM	SHORT-TERM	RECLAIMED	LONG-TERM
Segment 9A (Line 1)[3]	128	196	128	96	32
ALT: Segment 9A (Lines 1 & 2)	256	392	256	193	63
Segment 9B (Line 1)	168	263	168	163	5
Segment 9C (Line 2)	115	160	115	91	24
Segment 9D (Line 1)	555	935	555	527	28
ALT: Segment 10 (Line 2)	657	1,114	657	572	85
Segment 11 (Lines 1 & 2)	1,110	1,870	1,110	1,054	56
Other Transmission Line Components (Fiber Optic Regeneration Sites and Electric Power Service, Material and Construction Yards, Etc.)	420	70	420	350	70
Harry Allen Substation Expansion	40	10	40	30	10
Water Supply Facilities[3]					
Lages Station Water Supply Line	215	64	215	151	64
Lages Station Well Field & Pipeline[4]	N/A	N/A	158	151	64
ALT: Reduced Lages w/Coyote Valley Ranch (includes Well Field and water line on BLM and private lands)	869	261	891	618	273
ALT: Middle Well Field	362	109	362	253	109
ALT: South Well Field	789	237	789	552	237
ALT: North Well Field	171	51	171	120	51
Rail Line Facilities					
NNRy Rail Lead to North Plant Site	205	137	205	68	137
Alternative Rail Line (with water line)	1,643	1,543	1,694	158	1,586
Alternative Rail Line (without water line)	1,522	1,533	1,586	0	1,586

[1] This acreage would eventually be disposed of/sold to the Proponents
[2] A BLM ROW would not be required as the Worker Village would be situated on private land.
[3] Segment 9C (Line 2) would not be used in this alternative.
[4] Does not include access roads.

2.4 No Action Alternative

NEPA regulations require the No Action Alternative to be included in the alternatives analysis of an EIS (Section 1502.14(d)). Under the No Action Alternative, BLM would not approve the ROW or land sale; therefore the proposed EEC Power Plant and associated facilities (transmission lines, roads, rail lead and/or alternative railroad construction, and water facilities) would not be constructed or operated as described in the Proposed Action or Action Alternatives. It is, however, anticipated that the upgrade of the NNRy would be completed on the private lands as

discussed above. The No Action Alternative would not be responsive to the Proponents' needs. The Proponents would continue to purchase power required for growth if available on the open market until some future time when a new study could be completed to determine an alternative that would meet the PUCN requirements to provide additional company owned and operated baseload, fuel diversity, and lessen the impact of price volatility for ratepayers. Additionally, the high-voltage transmission line associated with the EEC would not be built, which would eliminate the ability to cost-effectively transport renewable energy from the North to customers in the South, nor share power resources between the Proponents' service territories in northern and southern Nevada. The existing conditions and trends in the Project Area would continue (Chapter 3 - Affected Environment). The project purpose and need, as described in **Sections 1.2** and **1.3**, would not be met.

2.5 Alternatives Considered but Eliminated from Detailed Analysis

This section describes the alternatives to the Proposed Action that were considered but not carried forward in the detailed analysis for various reasons. Alternatives eliminated include alternative power generating technologies, alternate sites additional to the North Plant Site Alternative, alternate water sources, and alternate transmission line routes.

A range of alternatives to be evaluated in an EIS should meet the need for the Project (see **Section 1.3**) and certain key principles derived from NEPA case law including:

- The overall range of alternatives should be governed by the "rule of reason." When there are potentially a large number of alternatives, only a reasonable number of examples, covering a full spectrum should be analyzed.
- All alternatives considered must meet the Purpose and Need as well as the Objectives of the Proponents, as detailed in the PUCN Order (Nevada PUC 2007). These are to meet service area growth needs, comply with directives to develop a diverse company-owned resource portfolio to protect customers from volatile purchased power markets, interconnect the Proponent's existing electric systems for northern and southern Nevada, promote connection to renewable energy resources, and decommission three aging coal units at the Reid Gardner Station (see **Section 1.3**).
- Alternatives must be "reasonable," i.e., they must be technically and economically feasible.
- Alternatives that are speculative and geographically remote need not be considered.
- Alternatives with environmental impacts that are obviously worse than the Proposed Action or other alternatives under consideration can be eliminated.

Alternatives eliminated from further evaluation in the EIS did not meet the project objectives and/or were eliminated for one or more of the principles listed above. These alternatives and the reasons why they were eliminated from further consideration are briefly discussed in the following sections.

2.5.1 Alternative Power Generating Technologies

Several alternative power generating technologies were evaluated and ultimately dismissed from further analysis. The sections below contain the specific rationale for each decision. **Table 2.5-1** compares each technology with criteria for determining if an alternative should be carried

forward for detailed analysis; these criteria are the same as described in the Purpose for the proposed project (**Section 1.2**) and are described below:

1,500 MW Baseload Capacity

As described in **Sections 1.6.4 and 1.6.6**, the Proponents face an increase in their open position from approximately 2,000 MW in 2007 to 4,000 MW in 2015. This large and growing open position can be filled with Company-owned or purchased power. The PUCN considered a variety of information related to the Proponents' current and future open positions and projections of power availability in the future, and concluded that, "*the construction of new baseload facilities is preferable than having to rely solely on wholesale markets to fill this open position*." They further stated that, "*large strategic additions should be owned and controlled by the Companies*." (PUCN 2007 p.56 paragraph 196). Baseload facilities are expected to operate 24 hours per day 7 days per week at high capacity factors. The net capacity factor of a power plant is the ratio of the actual output of a power plant over a period of time and its output if it had operated at full nameplate capacity the entire time. A supercritical pulverized coal generating facility is expected to achieve between an 85-95 percent capacity factor. The scale of the open position being addressed by the EEC and the requirement that it be efficient and economical with regards to fuel has lead the Proponents to select the EEC design with Phase 1 consisting of 1,500 MW of coal-fired generating capacity and Phase 2 consisting of another 1,000 MW of coal-fired capacity. Alternative generating technologies would need to meet both the scale and capacity factor of the proposed EEC to be considered.

Commercially Proven and Reliable

The selected generating technology must be commercially proven and reliable because the facility would be a baseload plant with a high capacity factor. Hundreds of commercial-scale, supercritical pulverized coal power plants have been built around the world. Alternate generating technologies must have sufficient operating experience to also provide high capacity factors in commercial applications within the electric power industry.

Diversifies Away From Natural Gas

As described in **Sections 1.6.5 and 1.6.7**, nearly 70 percent of the Proponent's total energy capacity in 2008 is expected to be generated by natural gas. Price volatility of natural gas creates a price risk for the Proponents' customers because increases in fuel costs are passed along to the ratepayers. The PUCN staff stated that the long-term price volatility for natural gas is 2.5 times that for coal and other factors may cause long-term natural gas prices to be higher than projected. They concluded "*Nevada ratepayers need a long-term hedge on the volatile natural gas market and a baseload coal resource will provide this hedge*." (PUCN 2007 p.21 paragraph 83). The PUCN revised order indicated, "the Commission has serious reservations about increasing NPC's and SPPC's reliance on natural gas to power its baseload plants." (PUCN 2007 p.57 paragraph 198). Alternative generating technologies would have to use energy inputs other than natural gas to be considered.

Capacity Sufficient to Connect Systems

The large cost to construct the proposed high voltage power lines between the EEC and the Harry Allen substation near Las Vegas to connect the NPC and SPPC transmission systems is unjustified without a proven source of generation to utilize this transmission capacity. The first 500 kV transmission line would have capacity to carry 2,000 MW and the addition of the second line would increase the total carrying capacity to 3,500 MW. The proposed 1,500 MW EEC would move 80 percent of its output (1,200 MW) south to the Harry Allen substation on the first line. The PUCN staff stated that it is doubtful the Proponents, "*could economically justify the*

intertie between NPC and SPPC without the EEC . . . the benefits of the intertie would likely not justify the $400 million investment that is required for the line." (PUCN 2007 p. 22 paragraph 88). Alternative generating technologies would have to provide approximately 1,200 MW of baseload capacity for the intertie transmission line to be considered.

Compatible with Local Conditions

Following extensive siting studies, two potential sites for the EEC were located in Steptoe Valley. Several conditions favor siting the facility in Steptoe Valley including: water availability, supportive community and leadership, existing rail right-of-way for fuel delivery, existing highway access, nearby approved electric transmission corridor, nearby community infrastructure, and potential to connect the SPCC and NPC transmission systems. Alternative generating technologies would have to also be compatible with the local conditions to be considered.

Meets PUCN Directive on Fuel

The PUCN made their decisions applicable to the EEC in an Order signed on November 13, 2006 and Revised on January 30, 2007. The PUCN Order contains a number of decisions and directives that must be complied with by the Proponents. One of the main directives contained in the Revised Order concludes that, "*a supercritical coal generation facility as proposed by the Companies is the best option to provide an adequate supply of electricity at a predictable price with acceptable environmental impacts*" (PUCN 2007 p.50 paragraph 177). This decision by the PUCN eliminates the consideration of alternative generating technologies other than supercritical pulverized coal at a scale equal to EEC.

2.5.1.1 Natural Gas

The PUCN Order approving the EEC as submitted in the 2006 IRP directed the Proponents to diversify fuel consumption, reducing over-dependence on a single source of fuel, reducing price volatility, and reducing dependence on natural gas and the associated risks of potential fuel shortages. Currently the Proponents rely heavily on natural gas fueled energy generation (about 70 percent). Natural gas prices have increased substantially and prices have been unstable. A gas-fired power plant would not comply with the requirement for diversification away from natural gas fuel (**Table 2.5-1**). It would not be compatible with local conditions in that there are no gas supply pipelines in Steptoe Valley to transport the fuel to the facility. A gas-fired power plant would not meet the PUCN directive for a supercritical pulverized coal fired power plant for the EEC.

TABLE 2.5-1. PROJECT CRITERIA USED TO EVALUATE POWER GENERATING TECHNOLOGY UNDER PROPONENTS OBJECTIVES

	PROJECT CRITERIA					
ALTERNATIVE TECHNOLOGIES	PROVIDES AT LEAST 1,500 MW OF BASELOAD POWER GENERATION CAPACITY	COMMERCIALLY PROVEN AND RELIABLE	DIVERSIFIES ENERGY AWAY FROM NATURAL GAS	PROVIDES LOAD SUFFICIENT (>1500 MW) TO CONNECT SPPC AND NPC SYSTEMS	COMPATIBLE WITH LOCAL CONDITIONS AND RESOURCE AVAILABILITY	MEETS PUCN DIRECTIVE ON FUEL
Natural Gas	Yes	Yes	No	Yes	No	No
Nuclear	Yes	Yes	Yes	Yes	No	No
Industrial/Municipal Waste	No	Yes	Yes	No	No	No
IGCC	No	No	Yes	Yes	Yes	No
Coal Liquefaction	No	Yes	Yes	Yes	Yes	No
Organic Rankine Technology	No	No	Yes	No	Yes	No
Wind	No	Yes	Yes	No	No	No
Solar	No	Yes	Yes	No	No	No
Geothermal	No	Yes	Yes	No	No	No

2.5.1.2 Nuclear

A nuclear power plant of comparable size would require approximately 50 percent more water than the proposed coal-fueled plant for facility operation and cooling purposes. Surface water (i.e. ocean, lake, or river) is the common source for nuclear plants because they consume large amounts of water for cooling during normal operation (UCS 2007). In addition, nuclear plants require an immediately ready source of water to remove heat still being generated by a reactor core during an emergency shutdown (Ultimate Heat Sink or UHS). There is not sufficient surface water in White Pine County for the operation of a nuclear plant. Further, it is unlikely that the Nuclear Regulatory Commission would approve the use of groundwater for plant operation and cooling. The permitting and licensing process for a nuclear power plant is more complex and time consuming than the proposed coal-fueled power plant. The Nuclear Regulatory Commission estimated it would take 6.5 to 9.5 years to permit a nuclear power plant. A nuclear plant would not be compatible with local conditions (lack of water and public/political opposition), would take too long to permit and construct, and would not meet the PUCN directive for a supercritical pulverized coal fired power plant for the EEC (**Table 2.5-1**).

2.5.1.3 Industrial/Municipal Solid Waste Fuel

Industrial solid waste, such as waste wood, waste coal, or combustible byproducts of an industrial process can be utilized as a source of fuel for power generation facilities. Electricity can be produced by burning municipal solid waste (MSW) as a fuel. Such plants are often called waste to energy (WTE) plants and consist of: solid waste receiving and processing facilities, incinerators, steam boilers and generators, and flue gas treatment. There are approximately 90 WTE plants operating in 27 states producing about 2,500 MW in total generating capacity from about 95,000 tons per day of MSW (see internet site http://www.dec.ny.gov/energy/8979.html). The primary function of these plants is to dispose of MSW as an alternative to land disposal in regions of the county with high population densities and therefore, abundant local sources of MSW. Even with large amounts of MSW available, such facilities seldom exceed more than 100 MW in size. A stand-alone facility of this size would not support the Proponent's need for a baseload power output of 1,500 MW and would not provide generating capacity sufficient to support construction of the intertie transmission line between the NPC and SPPC systems (**Table 2.5-1**). As the thermal energy content of MSW is much less than coal, a much larger amount of MSW would need to be imported to Steptoe Valley site than the coal proposed to be used in the EEC. The unburned portion of the MSW would need to be landfilled somewhere on site or in Steptoe Valley. For these reasons, a WTE power plant would not be compatible with local conditions or resource availability in Steptoe Valley (**Table 2.5-1**).

Many waste wood and "trash-burner" facilities that were designed and put into operation in the 1980's experienced significant problems in later years due to closure of the facility that provided the waste, such as paper mills, or the loss of the waste stream due to process changes. An example is new uses developed by pulp and paper manufacturers for sawdust and wood chips to manufacture composite wood products. The loss of such waste streams in many cases forced the wood-burning facility to switch to purchased wood chips, in many cases forcing them out of business because of the higher cost. Such risks would not meet the Proponent's need for a steady, reliable supply of fuel for the life of the facility and would not meet the PUCN directive for a supercritical pulverized coal fired power plant for the EEC (**Table 2.5-1**).

Industrial waste streams, such as refinery "bottoms" or waste coal from a mine, often provide an opportunity for obtaining a low-cost supply of fuel that can help eliminate a waste disposal issue. The size of the waste stream; however, is typically limited, and most projects utilizing waste

fuels are typically limited to 50-100 MW. In addition, the technology required to generate any significant amount of power utilizing such fuels is dramatically different from a large super-critical boiler, typically employing a circulating fluidized bed to deal with the significantly higher sulfur and heavy metals content prevalent in these waste streams. A stand-alone facility utilizing such waste streams would not meet the Proponent's need for a baseload, power output of 1,500 MW (**Table 2.5-1**).

When utilizing MSW fuel, there is potential for varying concentrations of trace metals commonly contained in the waste such as lead, mercury, cadmium, and beryllium to be vaporized during the combustion process. This leads to production of toxic air emissions and toxic ash, which can occur even in "state-of-the-art" WSW incinerators. Municipal waste incinerator emissions can include acid gases, mercury, dioxins and furans which are controlled with bag houses, carbon injection systems, and acid control scrubbers. To facilitate burning municipal waste fuel at the EEC power plant, special precautions could be required for air emission controls and combustion by-products handling. Permitting a municipal waste fuel fired power plant would be difficult and the potential environmental effects of air emissions and combustion by-product handling would be greater than the Proposed Action.

2.5.1.4 Alternate Coal Technologies

Integrated Gasification Combined Cycle (IGCC)

The Proponents' 2006 IRP submittal contained an analysis by Warley Parsons Group, Inc. entitled *Nevada Power IGCC Market Status and Feasibility Study*. The study evaluated the IGCC technology in the area of design characteristics, cost, emissions and various trade-offs of utilizing IGCC in a 600 MW coal-based power plant at Ely and several other sites in Nevada (2006 IRP, Technical Appendix II, Volume 1 of 3). The PUCN in their Order agreed with the report summary that, "*IGCC is an emerging technology which has some potential advantages with respect to pulverized coal, especially in emission and efficiency. However, the costs, performance, availability, reliability and maintainability of the new generation of IGCC systems are yet to be demonstrated*."

According to the National Energy Technology Laboratory (NETL), as of October 10, 2007, there are 121 power generation projects using coal as a feedstock proposed in the United States. Of that number, the NETL indicates 33 intend to use IGCC as the technology of choice. While the amount of IGCC plants proposed is encouraging, only one project has gone into operation since 2000, four are "progressing", (defined as either permitted, near- or under-construction), and 33 remain "announced". In contrast, 25 of 51 pulverized coal units are progressing, 12 of 24 circulating fluidized bed projects, and 4 of 13 supercritical coal units. In its Gasification Update, the NETL notes that dramatically increased capital costs of IGCC may have given developers pause before continuing to proceed with these projects.

The challenges that IGCC currently present to project developers and the Proponents are many:

1. Lack of Demonstrated Commercial Viability – Only two IGCC units currently are operational in the United States. The 285 MW Wabash River project in Indiana, which started commercial operation in 1995 utilizing Dow gasification technology (now ConocoPhillips), has run a total of 15,000 hours, per the NETL. In its early years, the facility demonstrated no more than a 20 percent availability (capacity factor). In later years, performance improved to the high 70 percent range, approaching 80 percent. The 485 MW Polk project in Florida has achieved a better track record, but neither facility approaches the scale or the availability required for a reliable, 1,500 MW baseload

power supply to meet the EEC project requirements (**Table 2.5-1**). Nor has either project demonstrated commercial viability using Powder River Basin coal as a feedstock.

The third project that was built in the United States with DOE support was developed by the Proponents at their Tracy facility near Reno. The 100 MW Pinon Pine facility used a Kellogg-designed air-blown gasifier. The project was a failure and ran less than 150 hours in three years of effort.

2. Technology Choices – There are now six technology suppliers vying to become the IGCC technology of choice, yet only four plants are underway to demonstrate their viability. Assuming several of these plants are operational by 2012, it will likely take until 2015 before assessments can be made as to which of the six technologies is commercially viable.
3. Redundancy vs. Reliability – The key challenge for IGCC technology suppliers is to demonstrate reliability using a single gasifier, without the need for multiple gasifiers and the attendant higher capital cost. The DOE's EIS for Southern Company's project in Orlando identifies that the Purpose and Need of the "demonstration" project is to verify reliability on a single gasifier. Kellogg is the supplier of this project's technology, this time using a modified version of its traditional fluid catalytic cracking technology. Construction has started; the unit is scheduled for completion in 2010, and hopefully will demonstrate reliability by 2015.
4. Backup Fuel – IGCC projects require access to natural gas or diesel fuel for startup purposes. Kellogg's EIS, for example, noted that the gasifier may require fuel for 10-15 hours following a scheduled maintenance or unscheduled outage. Such outages typically require the flaring of the backup fuel while the gasifier goes through its startup routines, producing a flare visible at night for significant distances.

   Of significance to any project located in northern Nevada is the lack of a natural gas pipeline to provide the volume of gas required for startup. The facility would have to rely on low-sulfur diesel stored in large volumes in order to provide sufficient backup fuel.
5. Operational Challenges – IGCC plants function, in essence, more as refineries than power plants. They typically consist of a complex cryogenic air separation plant, numerous compressors, the gasification facility, and significant process cycles, before any synthetic gas ("syngas") reaches the combustion turbine facility.
6. Efficiency Losses – The efficiency loss associated with the use of a combustion turbine at 6,000 feet above mean sea level would be greater than 35 percent. Each combustion turbine manufacturer has a table that demonstrates the efficiency loss as the elevation above sea level increases.

Although IGCC is a promising technology for future coal-based power generation, the current problems with lower overall generating scale, reliability and efficiency compared to the supercritical boilers proposed for Phase 1 of the EEC indicates this technology does not meet the requirements for Phase 1 at this time and IGCC would not meet the PUCN directive for a supercritical pulverized coal fired power plant for the EEC (**Table 2.5-1**). The Proponents will continue to explore the viability of IGCC or other alternative technologies for use in Phase 2 of the EEC.

Coal Liquefaction

Coal liquefaction, the Fischer-Tropsch process, is a technology that has been commercially demonstrated for many years. The process converts solid fuel, such as coal, to usable liquid fuels. Because of the high cost of production, it is typically utilized as a "last resort," when crude oil is in short supply.

Utilizing coal-to-liquids technology could involve two scenarios: 1) transportation of coal by rail to the proposed site and construction at the site of both a coal-to-liquids plant and a synthetic fuel, oil-fired combined cycle plant, or 2) construction of a coal-to-liquids plant at some off-site location, such as the Powder River Basin mines, with construction of a pipeline from the coal-to-liquids plant to the power plant site. In the first scenario, the project cost is estimated be 20 to 30 percent higher than a traditional pulverized coal plant and would not meet the PUCN directive for a supercritical pulverized coal fired power plant for the EEC (**Table 2.5-1**). Coal-to-liquids plants have at best demonstrated 80 percent capacity factors and thus would not provide the reliability required for a baseload generating facility. In the second scenario, a pipeline to transport oil from the liquefaction plant to the power site would need to be constructed resulting in costs that would be higher than the first scenario, not meeting the PUCN directive on Fuel.

Organic Rankine Technology (WOW Energies)

The WOW Energies technology is an evolving technology that is just now being demonstrated in small pilot plant configurations. The use of waste heat energy is an accepted practice that is a key component of gas-fueled, combined cycle plants, where waste heat from a gas turbine that would typically be exhausted to the atmosphere is used to generate steam, which is then used to generate additional electricity in a condensing steam turbine.

Pulverized coal plants are designed to utilize the maximum energy from combusting coal, and high temperature exhaust gases are used to the maximum extent possible to preheat combustion air. Any remaining heat, roughly equivalent in temperature to that of a combined cycle plant, is used for buoyancy to adequately lift flue gas from the stack. Therefore, there is little waste heat available for generation of additional power.

Utilization of solar energy is a key component of the Proponents' portfolio of traditional and renewable resources. It is possible that waste heat from a traditional boiler could be utilized in conjunction with a solar array, but such technologies have not been commercially demonstrated at a reasonable price. As stated above, all usable heat is utilized in maximizing a pulverized coal boiler's efficiency. Extraction of a portion of that heat would reduce the plant efficiency. It is likely that the most efficient solar facility would maximize the number of solar arrays in a given area. Transporting low-temperature steam some distance to a large solar array would likely lose more heat than would be generated in a solar power system.

None of these above systems have been commercially demonstrated at a size comparable to the EEC, and they do not provide a reliable source of baseload energy at the required scale of the EEC and would not provide sufficient generation capacity to support the intertie between the NPC and SPPC systems (**Table 2.5-1**). This alternative would not meet the PUCN directive for a supercritical pulverized coal fired power plant for the EEC.

2.5.1.5 Renewable Energy Technologies

Wind Power

To produce wind energy, wind turbines convert wind flow into mechanical power, which is used to generate electricity. The advantage of wind power is the lack of air emissions of any kind from operations. Technology advancements have enabled wind turbines to produce more power over

a wider range of wind speeds. A large utility-scale wind turbine can produce approximately 1.5 to 2 MW from a rotor approximately 300 feet in diameter and mounted on a tower approximately 300 feet high. Utility wind turbines are typically sited at locations with strong and steady average wind speeds of greater than about 13 miles per hour at a height of 150 feet (AWEAa 2008). Wind speed is a crucial factor in projecting wind turbine performance because the power available in the wind is proportional to the cube of its speed. This means that a small difference in average wind speed can make a big difference in electricity produced and there is little energy to be harvested at low wind speeds (6 mph wind contains less than one eighth the energy of 12 mph wind).

Suitable sites for wind farms must be found through studies of wind resources, which can take up to 3 years of data collection and modeling to determine if a site contains a commercially-viable resource of wind and would not be cost-prohibitive to construct due to terrain, proximity to existing transmission facilities, minimal environmental, and no visual impacts. "*Typically only a small number of wind energy site testing and monitoring authorizations ever lead to actual wind energy development projects.*" (BLM Instructional Memorandum No. 2006-216, 8/29/2006 – BLM Wind Energy Development Policy). The area of Nevada estimated to have average wind speeds above 13 mph (Wind Power Class 3) is about 1.8 percent of the area of the State (NSOE 2002). Many of the best potential sites are located in high elevations in mountainous terrain where access is logistically difficult or restricted by existing land management plans. Some general areas in the southern and southwestern part of the State have potential as do some valleys, including Spring Valley to the east of Steptoe Valley. The wind energy potential in Nevada (without consideration of existing land use restrictions) has been estimated to be approximately 5,700 MW (NSOE 2002).

A number of wind turbines are used to generate utility-scale power at a single wind power plant or wind farm. In open flat terrain, the American Wind Energy Association states that each megawatt of installed capacity in a utility-scale wind farm would typically require about 28 to 83 acres of unobstructed area of which about 2 to 5 percent is actually occupied by turbines, access roads, control buildings, substations and other equipment (AWEAa, AWEAb 2008). Access roads and an underground electrical cabling network connect the turbines together.

Individual wind energy systems are intermittent resources that produce energy when the wind is blowing and cannot currently be relied upon as a constant and reliable source of baseload power. Wind is variable and may not blow at the time of peak power demand. Significant additional baseload generation is required to back up the variability of any intermittent generation source, including wind power. Wind farms have typical capacity factors of 25 to 40 percent although they may achieve higher capacity factors during windy periods (AWEAb 2008). Due to the low capacity factor, it would not be possible to build one alternative wind power plant in the Ely area that would replace the EEC because wind resources in the local area would not be sufficiently reliable for a baseload generating source (85 – 95% capacity factor). Wind power alone would not be a technically feasible alternative to the EEC power plant due to the inability of wind power to provide a reliable firm baseload energy source at a comparable scale at any one location (**Table 2.5-1**).

To begin to understand the scale of a wind power source to compare with the EEC Phase 1 power plant, it would be necessary to hypothetically consider building multiple wind farms at a number of widely spaced locations, all tied into the Proponents' transmission system, the assumption being that enough of these sites would have sufficient wind at any moment to produce a reliable capacity of 1,500 MW at any one time. Using values stated by the American Wind Energy Association (AWEAa 2008), 1,500 MW of wind generating capacity would require

wind turbines spread over about 90,000 acres (1,500 MW x 60 acres each), assuming a capacity factor of 100 percent. However, assuming a capacity factor of 30 percent is applicable to the entire wind harvesting system, these areas would need to be multiplied by a factor of 3.33 yielding a total wind harvest area of about 300,000 acres with a total disturbance area of about 15,000 acres (5% of total). These estimated areas do not include additional disturbance that would be required for new transmission lines. Such a large network of wind farms would not be able to be concentrated in one area like the proposed EEC and thus, would not be able to provide sufficient generating capacity to support the intertie between the NPC and SPPC transmission systems (**Table 2.5-1**). Wind power also would not meet the PUCN directive for a supercritical pulverized coal fired power plant for the EEC (**Table 2.5-1**).

The Proponents do plan to utilize wind and other renewable energy sources in addition to the baseload power that would be provided by the EEC, and wind energy is part of the overall energy objectives of the Proponents. As of late 2006, NPC had identified eight potential wind generation sites in eastern Nevada and was doing exploration work at these sites (PUCN 2007 p. 91, paragraph 315). If these projects went into development they would add several hundred MWs of wind generation capacity to the Proponents' system.

A key component of the EEC project is the connection of the Proponents' existing transmission systems and a new transmission line between the Ely area and Las Vegas with capacity for the EEC power and additional capacity for these and other renewable energy projects, which would allow power to flow throughout the combined system. Without this connection, there is a relatively limited amount of renewable energy that can be developed in the northern part of the State, because SPPC's capability to absorb it is limited. Presently most of the State's renewable resources are located in Northern Nevada, the transmission lines included in the Proposed Action would allow renewable energy in the SPPC system, as well as electricity from other renewable resource developments to flow south into the NPC system, to support the growing electricity demand in the southern part of the State. This would support the 20 percent renewable energy requirement mandated to be in place by 2015 by the Nevada Renewable Portfolio Standard (Nevada Assembly Bill 385 Section 22, 2005) by providing a pathway to market.

Solar Power

Solar energy is generated through the conversion of solar radiation to useful power either by concentrating solar power (CSP) systems to produce heat, which can then be used to generate electricity through mechanical means, or converting it directly into electricity through photovoltaic systems. There are three main types of concentrating solar power systems: parabolic-trough, dish/engine, and power tower.

Parabolic-trough CSP systems concentrate solar energy through long rectangular, curved (U-shaped) mirrors. The mirrors are kept oriented toward the sun during daylight hours, focusing sunlight on a collector pipe that runs down the center of each trough. This heats specially formulated oil flowing through the pipe. The hot oil then is used to boil water in a conventional steam generator and the steam turns a standard turbine generator to produce electricity. Utility-scale, parabolic-trough CSP systems have been built in many locations throughout the world and currently are the primary design for commercial solar power generation in the American Southwest, including one operating plant and several proposed ones in Nevada.

A dish/engine CSP system uses a mirrored dish (similar to a very large satellite dish). The dish-shaped surface collects and concentrates the sun's heat onto a receiver, which absorbs the heat and transfers it to fluid within an engine. The heat causes the fluid to expand against a

piston or turbine to produce mechanical power. The mechanical power is then used to run a generator or alternator to produce electricity. Such systems are not currently in use at utility scales in the United States, but there is interest in pilot testing commercial plant designs.

A power tower CSP system uses a large field of mirrors to concentrate sunlight onto the top of a tower, where a receiver is located. Molten salt flows in piping from tanks up the tower and through the receiver where it is heated to a very high temperature and is piped to insulated storage tanks. Heated salt is drawn from the storage tanks and is pumped through a heat exchanger to produce steam, which is then used to generate electricity through a conventional steam generator. Power towers can achieve higher temperatures than trough systems and heated, molten salt retains heat efficiently, so it can be stored for days before being used to produce electricity. The ability to store solar heat in large quantities of molten salt offers the potential for generating electricity around the clock and on cloudy days. Power towers have been demonstrated by the DOE in the United States, and some commercial plants are now in the design stage in the Western U.S., including Nevada.

Solar cells, also called photovoltaics (PV), convert sunlight directly into electricity. Solar cells are made of semi-conducting materials. When sunlight is absorbed by these materials, the solar energy knocks electrons loose from their atoms, allowing the electrons to flow through the material to produce electricity. This process of converting light (photons) to electricity (voltage) is called the *photovoltaic (PV) effect.* The performance of a solar cell is measured in terms of its efficiency at turning sunlight into electricity. Only sunlight of certain energies will work efficiently to create electricity, and much of it is reflected or absorbed by the material that make up the cell. Because of this, a typical commercial solar cell has a conversion efficiency of about 15 percent of the sunlight striking the cell. Low efficiencies mean that larger arrays are needed, and that means higher cost. Improving solar cell efficiencies while holding down the cost per cell is an important goal of the PV industry.

Individual solar energy systems are intermittent or non-firm resources that produce electricity when the sun is shining. When sunlight is not available, some other source of power is necessary to supply energy. Solar power production peaks midday and declines later in the day, producing only 30 to 40 percent of the peak output capability of the solar plant during late afternoons and early evenings when the Proponent's summer peak load is at its maximum. Solar power generating stations can address the issue of diurnal swings in generating capacity through increased solar collection during the peak daylight times and storing quantities of heated collection liquid in insulated tanks for later use in producing steam. Alternatively, the thermal energy in the solar collection system can be augmented by fossil fuel combustion to extend the ability to generate steam and electricity. This is typically done at the current trough CSP power plants in operation in the U.S.

According to the Solar Electric Power Association (SEPA), the commercial U.S. solar power market in 2007 included approximately 419 MW of installed CSP capacity and 476 MW of PV (SEPA 2008). Two California utilities were ranked in the top ten in the U.S. by the SEPA for total solar electric capacity and NPC/SPPC were ranked third.

Solar power potential for commercial scale generating stations has been studied by federal agencies and the Western Governors Association (WGA). The key siting criteria are: high levels of solar radiation, near level land surface, proximity to electric transmission facilities, and non-sensitivity to CSP development (WGA 2006a). In Nevada, the potential locations for such sites are concentrated in the southern counties where the typical CSP plant is expected to require approximately 5 acres per MW of nominal capacity (WGA 2006a). The WGA anticipates

CSP development in the Southwest to total about 4,000 MW by about 2015 with approximately 500 MW of capacity development in Nevada.

According to the Department of Energy, CSP technologies currently offer the lowest-cost solar electricity for utility-scale power generation (www.eere.energy.gov). PV stations are currently less efficient at converting the solar energy and the electricity they provide is more expensive than CSP and much more than conventional power sources. CSP power tower generating facilities have typical capacity factors of about 25 percent without energy storage and potential capacity factors of about 65 percent with thermal storage.

Although solar power is an effective technology and will undoubtedly provide an increasing percentage of the Proponents' energy portfolio in the future, it could not locally provide the required amount of reliable, baseload power to replace the EEC. The 1,500 MW of nominal capacity for the EEC as designed is a number of times larger than all the CSP generating capacity in operation in the U.S. at the end of 2007 and the potential capacity factor for even a highly efficient CSP plant is lower than required for baseload. Therefore, a solar power plant would not provide the baseload availability or scale to replace the EEC as proposed and, if located near Ely, would not provide adequate capacity to support the intertie between the NPC and SPPC transmission systems (**Table 2.5-1**). The development of large-scale photovoltaic and CSP plants is advancing, but solar power still costs much more to produce than electricity generated by conventional power plants like the EEC. Solar power would not meet the PUCN directive for a supercritical pulverized coal fired power plant for the EEC (**Table 2.5-1**).

The Proponents do plan to utilize solar and other renewable energy sources in addition to the baseload power that would be provided by the EEC. The Proponents expect to expend an additional $2 billion to attain renewable portfolio standard (RPS) compliance between 2007 and 2015 (PUCN Revised Order, page 91, paragraph 311). NPC has a long-term power purchase agreement with the 64 MW Nevada Solar One facility near Boulder City and obtains solar power from a number of other smaller facilities. The connection of the Proponents' transmission systems is a component of the EEC project and would allow moving power throughout the combined system and facilitate moving electricity from future sources of renewable energy to the major load centers.

Geothermal Resources

Geothermal resources are contained in underground reservoirs of steam, hot water, and hot dry rocks. Hot water or steam extracted from these resources can be used to drive steam turbine generators to produce electricity. Alternatively, hot water can be used in a binary system to boil an organic liquid, which can drive turbines in a closed loop with dry condensers. Geothermal resources that can be commercially developed are unique geologic features that can be exploited only where they are known to exist. There are a number of these features dispersed across northern Nevada. The WGA has estimated that the total commercial geothermal potential for Nevada may range from just under 1,500 to about 2,900 MW (WGA 2006b).

The Proponents are developing and procuring much of the existing, commercial geothermal power capacity in the State, and have been since the mid-1980's. In 2007, the Proponents obtained power from 16 geothermal power plants in the State ranging from less than 1 MW to 21.5 MW in size, with a combined capacity of just under 161 MW (www.nevadapower.com). Additional geothermal power will undoubtedly be commercially developed and the Proponents plan to continue to expand this category in their energy portfolio in the future.

At the current time, however, the amount of economically proven geothermal resources is significantly smaller than the potential amount. As leases are obtained and studied, test wells

drilled, electrical interconnection studies completed and projects developed, additional resources become available for use within the state. Most projects tend to be in the 25 to30 MW size range. As an example, in 2007, the Proponents recently signed contracts for roughly 100 MW of new geothermal resources from three new projects.

Given the uncertainty about the viability of new geothermal resources, the relatively small size of the plants, the significant time to develop the resources, and competition from power purchasers in other states that will seek to acquire the same resources, the Proponents cannot rely on geothermal solely as a source of power to meet the purpose and need of the project. The relatively small size of the largest geothermal plants in Nevada do not come close to the 1,500 MW of baseload generating capacity of the EEC. Although, geothermal development potential is widespread in northern Nevada, locations of geothermal energy concentrations that can support commercial generating stations are relatively rare and widely spaced. There are thermal springs in the Steptoe Valley area, but there is no evidence of a commercial-scale geothermal resource in the valley. These characteristics would not meet the project requirements for a 1,500 MW baseload capacity in the Ely area that would also support the intertie between the NPC and SPPC transmission systems. Finally, a geothermal plant would not meet the PUCN directive for a supercritical pulverized coal fired power plant for the EEC (**Table 2.5-1**).

2.5.2 Alternate Sites to the North and South Plant Sites

Siting projects such as the EEC requires that certain criteria be met, as discussed in the Purpose and Need (**Sections 1.2** and **1.3**). The location of the power plant must comply with the criteria, "Compatible with Local Conditions and Resource Availability". Multiple locations can comply with this to various degrees, so it is necessary to objectively consider the more detailed characteristics of each site to determine which ones meet this project criteria.

Two siting studies were conducted for the EEC before the EIS project commenced. As a regulated utility, the Proponents conducted the screening studies mindful of the obligation to propose a project that is sufficiently financially responsible so as to ultimately be included in the rate base. Those two studies are:

- *Nevada Power Site Screening Study*. Lockwood Greene Engineers Inc. December 2003.
- *Constraint Study for Ely Energy Center*. Burns & McDonnell Engineering Company, Inc. June 2006.

Lockwood Greene Engineers Inc. screened five potential coal fired power plant sites in Nevada and Utah. The sites considered were investigated for constraints and compared on the basis of air quality, water management, transmission line access, rail line access, roads, and environmental, social, and economic factors. This study recommended three sites located in White Pine County, Nevada including a North Plant Site in Steptoe Valley, a Butte Valley site, and a Spring Valley site. The study stated that the least desirable sites of the five were Currant, in Nye County, Nevada and Eskdale, in Millard County, Utah. The Proponents reviewed these recommendations and added another site closer to McGill, the South Plant Site. In 2006, Burns and McDonnell reassessed the siting recommendations of Lockwood Greene (2003) along with the South Plant Site in a constraint study that evaluated each potential site for: access to available infrastructure, proximity to the community services offered by Ely/McGill, distance from air quality sensitive areas, adequate topography and acreage, and considerations of the potential for both noise and visual impacts. The constraint study resulted in the South Plant Site

in Steptoe Valley being offered as the Proposed Action and the North Plant Site as the alternative plant site.

Public scoping of this EIS resulted in a number of additional plant sites being recommended for consideration including: use of the LS Power proposed alternative site in Steptoe Valley, a site near the Gonder Substation in Steptoe Valley, and an unspecified site nearer to the power demand.

More information on why certain plant sites were not considered in this EIS is included in the following subsections.

2.5.2.1 Alternate Site: Spring Valley

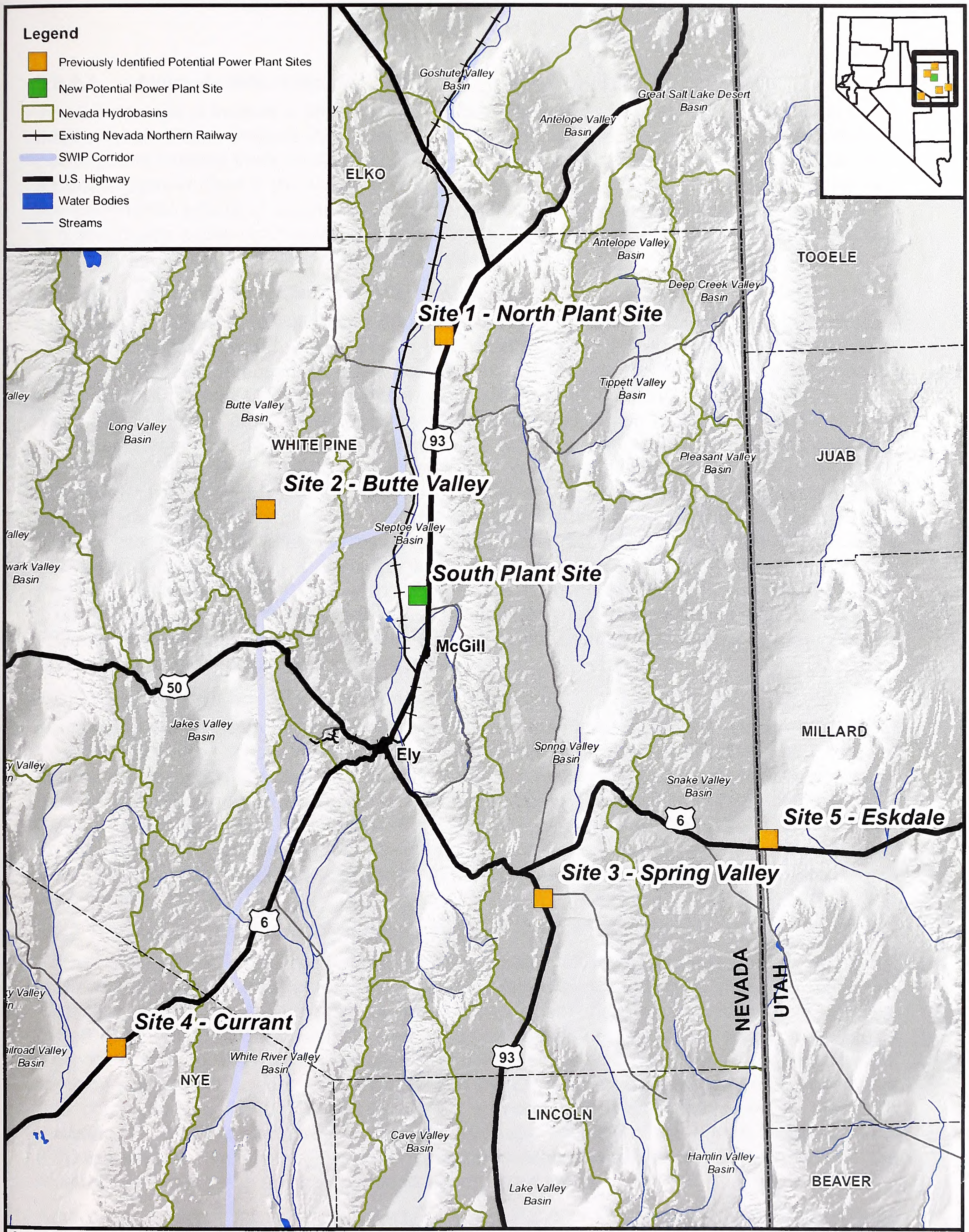
Locating the EEC project in Spring Valley, in the southeast portion of White Pine County, Nevada, was considered (**Figure 2.5-1**). Great Basin National Park (GBNP) is 15 km (9.3 miles) from the Spring Valley site. This park was designated a national park in 1986 after the prevention of significant deterioration (PSD) regulation pertaining to air quality was established and is not a PSD Class I area. However, the Federal Land Management agency decision-maker for the plant would likely hold air quality impacts at GBNP to Class I criteria standards or to some level less than Class II increment limits (Lockwood Greene 2003). The Spring Valley site would also be within the viewshed of the western reaches of GBNP, therefore there are potential incompatibility issues with this site. The Spring Valley site is located distant to a rail line and is also distant from the SWIP Corridor. These constraints were noted in the Lockwood Greene 2003 siting study, but they did not eliminate the site from consideration at that time. Subsequently, the available water rights in Spring Valley were acquired by the Southern Nevada Water Authority (SNWA) and are no longer available for industrial use (Burns and McDonald 2006). This in combination with the site's proximity to the GBNP, lack of rail access, and distance to the SWIP Corridor eliminated this site from further analysis.

2.5.2.2 Alternate Site: Butte Valley

The Butte Valley site is located in central White Pine County, Nevada (**Figure 2.5-1**). This site lacks the highway access of other alternatives considered and would require additional road upgrades, including a new substantial two-lane road, to make the site accessible year-round during construction and operation. Construction of a new rail line through difficult terrain would pose cost-prohibitive engineering challenges through undeveloped areas of the valley. The miles of linear facilities required for the site becomes a constraint factor affecting cost, schedule, and potential environmental impacts. Further, there is a potentially active fault zone crossing the middle of the site. For these reasons stated by Burns and McDonnell (2006) this site was not carried forward for analysis.

2.5.2.3 Alternate Site: Currant

The Currant site is located in Nye County, Nevada (**Figure 2.5-1**). The Lockwood Greene siting study (2003) indicated that there were already significant water rights issues with this location and obtaining needed water for project operations would be problematic. This site is distant from a functioning railway and would require over 200 miles of new railroad construction/upgrade. This site was eliminated from further consideration by Lockwood Greene (2003).



Source - Base Map: ESRI and National Atlas of the United States
Potential Power Plant Sites - Burns & McDonnell Engineering Company, Inc.

1:1,000,000

10 0 10 Miles

20 0 20 Kilometers

Scale is 1:1,000,000 when printed at 8.5"x11"

N

FIGURE 2.5-1
POTENTIAL POWER PLANT SITES EVALUATED
ELY ENERGY CENTER

2.5.2.4 Alternate Site: Eskdale

The Eskdale site is located in Millard County, Utah (**Figure 2.5-1**). Millard County is home to the Intermountain Power Project, near Delta, Utah. Economic conditions and public sensitivity to power plants indicate there could be socioeconomic constraints (Lockwood Greene 2003). With an existing power plant in the county there could be potential air quality and visibility issues with the incremental effects of another power generation plant. Further, the Hurricane Fault System is a seismically active north-south fault in the area. For these reasons, this alternative site was dropped from further analysis by Lockwood Greene (2003).

2.5.2.5 Alternate Site: LS Power Alternative Site

LS Power is proposing to build the 1,500 MW coal-fired White Pine Energy Station in Steptoe Valley, which lies between the proposed EEC North and South Plant site alternatives (BLM 2007e). LS Power proposed an alternate plant site which was located between its Proposed Action site and the EEC Proposed Action South Plant Site. The EEC Proposed Action South Plant Site is located as close as possible to the Proposed Action LS Power plant site while maintaining enough buffer between the two sites to obtain an air quality Operating Permit to Construct (OPTC) from NDEP. The federal PSD regulations prevent major sources of air pollution from over-consuming available air shed by setting incremental growth thresholds for three criteria pollutants. In order to meet these thresholds, the air quality impacts from the two facilities cannot overlap, which makes the required buffer distance approximately 10 miles. The LS Power alternative site is even closer to the LS Power Proposed Action site than the EEC Proposed Action South Plant Site, which negates the ability to use the LS Power alternative site. If LS Power proceeds with its Proposed Action site in Steptoe Valley (BLM 2007e), then the LS Power alternative site is not viable, due to PSD air quality permitting requirements. The site was dropped from further consideration for this reason.

2.5.2.6 Alternate Site: Existing Gonder Substation

The area by the existing Gondor Substation between the highway and the bench of the Schell Creek Range does not have sufficient space to accommodate a 3,000-acre plant site. There are several private properties and transmission lines that restrict large-scale development around the existing substation site. The substation is the termination point for SPPC's Falcon to Gonder 345 kV transmission line. Connection from Gonder Substation to the SWIP Corridor would impact Smith Valley residents. Stack heights at the plant site would be a safety concern, since the Gonder Substation is in close proximity to the Ely airport. This site was dropped from further consideration.

2.5.2.7 Location Near the Demand for Power

Construction of new power generation facilities located close to populated areas where the demand for power is the greatest would be constrained by the ability to meet the air quality permitting requirements of the urban areas. The Proponents' major load centers with the majority of the demand for power are Reno and Las Vegas. The Las Vegas area is classified as "non-attainment" for ozone and particulates, and the Reno area is classified as "non-attainment" for ozone, carbon monoxide, and particulates by the EPA. As a result, a coal-fueled power plant that could produce 1,500 MW would not be economically feasible in these two areas, as measured by PUCN's standards for cost effectiveness, because of the offsets required by the PSD air quality regulations. The PSD program was implemented by EPA to control the incremental increases in air quality impacts in populated areas.

Additionally, locating plants in the vicinity of either Reno or Las Vegas would not provide an economically feasible alternative to tie the load centers together and share resources without

the presence of a generating facility to anchor the transmission line. In lieu of such an anchor, the alternative of constructing only a transmission line between the two systems has been studied in the past. In the 2004 SPPC Resource Plan, a Gonder (Robinson)-Harry Allen line Feasibility Study was conducted specifically to address an Intertie to supply renewable resources to the NPC system (at Harry Allen) without the EEC (the resources would have connected to the northern system at Gonder). The study concluded that although the benefits are significant, they did not economically justify building the Intertie line by itself. In the Commission's Order approving the 2006 Resource Plan, the Commission recognized "the EEC will provide the anchor resource that can justify the Intertie linking NPC's and SPPC's systems" (PUCN 2007, p. 21, paragraph 83g).

Moreover, without an economic pathway from a power source to the customers, development of affordable renewable energy in the northern and eastern portions of Nevada would be significantly diminished. This appears to be confirmed by the lack of completion of any wind generation projects in eastern Nevada, despite the construction of SPPC's Falcon to Gonder 345KV transmission line in 2000. However, the apparent anticipation of the EEC's transmission link to both systems has resulted in 8 to 10 wind study applications to the BLM, just in White Pine County alone. Therefore, anchoring the EEC with a coal-fired generating facility meets the purpose and need of providing renewable energy to the overall Nevada market and meets the Renewable Portfolio Standard mandated by Nevada.

2.5.3 Alternate Water Sources

Nine water sources were considered as alternatives for the project. The following two were eliminated as described.

2.5.3.1 Butte Valley Water Well Field

The Proponents have water right applications pending for a well field within Butte Valley, which lies immediately west of Steptoe Valley in White Pine County. A preliminary study was performed by the Proponents to identify groundwater development in Butte Valley and initial indications based on information from nearby oil well logs show the potential for a significant groundwater aquifer in the valley. However, the Butte Valley aquifer is currently untested with regard to its ability to provide large and reliable quantities of groundwater suitable for the needs of the EEC. Additional test wells would need to be drilled to confirm the depth and conditions of this aquifer. The Proponents decided it was not feasible to pursue this water supply alternative for the EEC since there are other water supply alternatives in Steptoe Valley that are located in a basin with proven capacity for high yielding wells; are less costly to develop; and would have less environmental impact.

Assuming a reliable groundwater supply could be developed in Butte Valley, it would be far costlier to transport this water to the EEC than the other alternatives in Steptoe Valley due to the extra distance to the plant site; the need to build road and electric power infrastructure into this remote area; and the need for one and possibly two pump stations to lift the water over the Egan Range. Environmental impacts of building this water line over the mountains (due to road construction, excavating in rock terrain, and possible encroachment on perennial streams) would be obviously greater than laying a pipeline between the sources in Steptoe Valley and the EEC plant site. For these reasons, Butte Valley was considered not to be a reasonable water supply alternative for Phase 1 at this time.

Given more time and investigation, the Proponents consider Butte Valley to be a potential future water source for Phase 2 of the EEC, but this would be the subject of a future environmental analysis for that project.

2.5.3.2 Other Valley Well Fields

The Proponents have water right applications pending for a well field in Jakes Valley. A preliminary study was performed by the Proponents to identify groundwater development in Jakes Valley and it was determined the overall direction and movement of groundwater is less understood than Butte Valley due to the lack of existing wells in the basin and detailed geologic mapping inside of the surrounding mountain ranges. Further, the additional distance required for a pipeline would make this alternative cost prohibitive and would likely cause more significant environmental impacts due to increased ground disturbance for the longer pipeline.

2.5.4 Electric Transmission Corridor South of Existing Line in Smith Valley

This route does not eliminate or reduce the number of private land parcels that would be directly impacted by construction of the transmission lines. This route would require the new lines to either impact private land parcels located north of the existing transmission lines in Smith Valley, or cross over both of the existing transmission lines utilizing very tall support structures at two locations and impact private land parcel located south of the existing transmission lines in Smith Valley. The required line crossings would be on the east side of Hercules Gap and near the proposed Robinson Summit Substation. Line crossings reduce the reliability of the lines crossed and add to visual impacts. Also, west of Smith Valley, this route would be on a steep side hill requiring more road construction and reclamation.

2.5.5 Conservation and Energy Efficiency

Energy conservation is based on the conscientious use of energy and improving energy use habits, in other words, not carelessly wasting energy. To this end, the Proponents have implemented ongoing energy conservation programs in their markets to help alleviate the need for additional generating capacity. The Proponents energy conservation plan, also known as its Demand Side Management (DSM) plan, is intended to exceed the 25 percent of the RPS requirement and mitigate peak demand growth. The Proponents' 2006 and 2007 DSM plans for the following three years included a variety of energy conservation measures including:

- Incentives to manufacturers and dealers for Energy Star manufactured homes.
- Support for introduction of zero and near zero energy homes in Las Vegas.
- Incentives for energy efficient pool pumps.
- Assistance to small hotel/motel owners to install air conditioning (A/C) controls and occupancy sensors.
- Incentives for customers to buy Energy Star appliances and lighting products.
- Credits to residential costumers for A/C controls during peak demand periods.
- Incentives to non-residential customers to install energy saving electrical equipment.
- Collection and recycling of second refrigerators.
- Weatherization services for low-income dwellings.
- Education programs about the benefits of energy conservation.

- Assessment of innovative energy-efficient technologies.
- Support of energy conservation and peak demand reduction in public schools.
- Grants for efficiency upgrades to commercial spaces leased or owned by non-profits.
- Rebates to homebuilders and owners who install specified high efficiency A/C.

The total expenditures for DSM projects proposed by the Proponents are as follows:

- Nevada Power Company has proposed $123 million for the action plan period 2007 through 2009. Of this amount, $104 million (PUCN 2007 p.87, paragraph 297) has been approved by the Public Utility Commission of Nevada which stated in the 2006 order that the DSM programs were in the public interest and well-suited to meet the load objective. The additional $19 million has been filed with the Commission and is pending Commission review and approval.
- Sierra Pacific Power has approved $30 million for the action plan period 2008 through 2010.

Each of the three years of NPC's conservation programs will reduce peak loads of new demand by approximately 70,000 kW of new demand and 185 million kWh of energy consumption with the savings continuing in future years. Each of the three years of SPPC's conservation programs will reduce peak loads of new demand by approximately 14,600 kW of new demand and 85 million kWh of energy consumption with the savings continuing in future years. As an example, the Proponents will be subsidizing the replacement of over 2,000,000 incandescent light bulbs with energy-efficient compact fluorescent bulbs in the homes of their customers each year for the next three years and continuing after that until 2012 when the sale of incandescent bulbs becomes illegal in Nevada. This replacement program alone is expected to avoid approximately 15,000 kW of increased demand over the next three years. These multi year programs are in addition to the savings from energy efficiency measures installed in previous years and will be added to by the energy efficiency measures planned for each of the future years. The anticipated power savings are already included in the Proponents' projections of future energy demand that supports the purpose and need for the EEC project.

However, conservation alone cannot offset the need for the 2,500 MWs proposed for the EEC project and would not meet the purpose and need for the project. It does remain a key and essential part of the Proponents' resource strategy.

2.6 Comparison of Alternatives and Summary of Impacts

2.6.1 Comparison of Alternatives

Figure 2.6-1 and **Table 2.6-1** below compare the project elements of the Proposed Action and Action Alternatives.

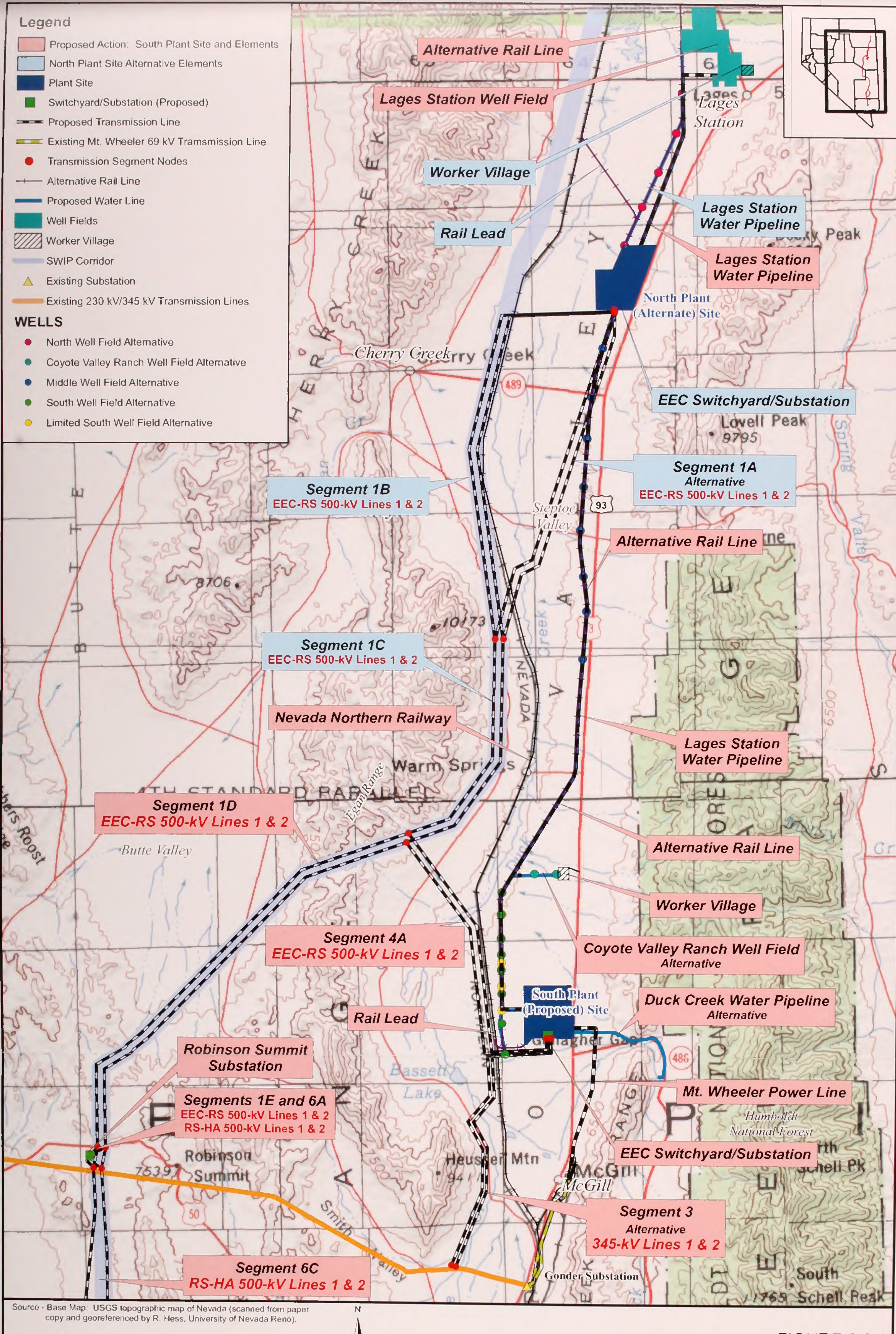


FIGURE 2.6-1
COMPARISON OF PROPOSED ACTION AND
ALTERNATIVE PROJECT ELEMENTS
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TABLE 2.6-1. COMPARISON OF PROPOSED ACTION AND ACTION ALTERNATIVE PROJECT ELEMENTS

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES	SOUTH PLANT SITE (PROPOSED ACTION)	NORTH PLANT SITE ALTERNATIVE
PLANT SITE		
Type and size of facilities would include: • steam boilers and turbines • emission control equipment • fuel handling system • on-site rail loop and rotary dumper for coal unloading • long-term coal pile • coal storage domes • site well for potable water • water treatment building • mechanical draft cooling towers • air cooled condensers • evaporation ponds • water storage reservoir and storage tank • landfill (1,000 acres) • plant switchyard • maintenance and warehouse facilities • office and administrative buildings • onsite 50-meter tall monitoring tower		
3,000-acre footprint (2,500 acres disposed by BLM and 500 acres ROW granted by BLM)		
	Site located in South Steptoe Valley	Site located in North Steptoe Valley
	Worker village located in South Steptoe Valley on private land	Worker village located in North Steptoe Valley on private land
	Mt. Wheeler transmission lines would be upgraded and a new 69 kV line built to provide a reliable power supply to the South Plant Site, the worker village in South Steptoe Valley, and well fields and pump stations.	Mt. Wheeler transmission lines would be upgraded and a new 69 kV line built to provide a reliable power supply to the North Plant Site, the worker village in North Steptoe Valley, and well fields and pump stations.

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES	SOUTH PLANT SITE (PROPOSED ACTION)	NORTH PLANT SITE ALTERNATIVE
ELECTRIC TRANSMISSION FACILITIES		
A new switchyard (kV capacity varies by alternative) would be constructed adjacent to the power plant, but within the 3,000-acre boundary of the Plant Site. A 100-foot tall microwave tower would also be installed.		
	Robinson Summit Substation: In conjunction with the proposed White Pine Energy Station, a new 500/345-kV Robinson Summit Substation would be constructed near the SWIP Corridor approximately 20 miles northwest of Ely. It would require approximately 80 acres and would be accessible via an access road from Hwy 50. A 100-foot tall microwave tower would also be installed. A new 500-kV EEC switchyard would be constructed at the South Plant Site. Two new 500-kV transmission lines would be constructed from the EEC switchyard north along the NNRy to the SWIP Corridor and would then follow the SWIP Corridor south to the Robinson Summit Substation. These 500-kV transmission lines would follow the route incorporating Segments 4A, 1D, and 1E (approximately 34 miles) and connect to Segments 6A, 6C, 8, 9B, 9A (9C for Line 2), 9D, and 11 going south to Harry Allen Substation. As an alternative, Line 2 would be routed along Segment 10 instead of Segments 9B, 9A, 9D). The existing Falcon – Gonder 345-kV transmission line would be looped approximately 1-mile (depending on final site location) into the Robinson Summit Substation to interconnect the power plant to the SPPC electric system.	**Robinson Summit Substation:** Same as the Proposed Action, except that the new 500-kV switchyard would be constructed on the North Plant Site. Two new 500-kV transmission lines would be constructed from the EEC switchyard west to the SWIP Corridor and would then follow the SWIP Corridor south to the Robinson Summit Substation. These 500-kV transmission lines would follow the route incorporating Segments 1B, 1C, 1D, and 1E (approximately 49 miles) and connect to the southbound segments the same as the Proposed Action. Alternative Segment 1A The 500-kV transmission lines would not follow Segment 1B. The transmission lines would extend south and follow Segment 1A to avoid private property located in the SWIP Corridor along Segment 1B.

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES	SOUTH PLANT SITE (PROPOSED ACTION)	NORTH PLANT SITE ALTERNATIVE
	EEC Substation Option: The Robinson Summit Substation would not be constructed. Instead, the planned 500-kV EEC Switchyard would be expanded to create a 500/345-kV EEC Substation. Two new 500-kV transmission lines would be constructed from the EEC 500/345-kV Substation north along the NNRy to the SWIP Corridor. These 500-kV transmission lines would follow the route incorporating Segments 4A, 1D, 1G, 6C, 8, 9B, 9A (9C for Line 2), 9D, and 11 going south to Harry Allen Substation. As an alternative, Line 2 would be routed along Segment 10 instead of Segments 9B, 9A, 9D). In addition, two approximately 13 mile line folds would be constructed from the Falcon to Gonder 345-kV line near Hercules Gap north to the South Plant Site along Segment 3. The Falcon to Gonder 345-kV line would be reconfigured into two lines, one from Falcon to EEC and the second from EEC to Gonder.	
The existing Harry Allen 500-kV Substation, about 20 miles northeast of Las Vegas, would be expanded by approximately 40 acres to accommodate the additional equipment to support the EEC project.		
	WATER SUPPLY FACILITIES	
Well fields: • permanent roads to each well • pump station • pump station forebay • pipelines connecting wells to forebay	**Lages Station Well Field:** 8,000 AFY (8,000 gpm for six months and 2,000 gpm for the remaining six months of the year), requiring the raw water pond on the plant site to be expanded for summer month storage. One underground pipeline would originate near Lages Station and continue south parallel to the center line of the Alternative Rail Line Option alignment. The waterline would continue 43 miles to the South Plant Site.	**Lages Station Well Field:** Same as the Proposed Action, except the waterline would extend 9 miles to EEC's North Plant Site.

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES	SOUTH PLANT SITE (PROPOSED ACTION)	NORTH PLANT SITE ALTERNATIVE
	Reduced Lages Station Well Field and Coyote Valley Ranch Well Fields Alternative: 5,000 AFY (6,000 gpm from the Lages area for six months and nothing for the remaining six months). 3,000 AFY would be pumped at a rate of 2,000 gpm for twelve months from Coyote Valley Ranch Well Fields. The waterline would extend 9 miles to the South Plant Site.	**Reduced Lages Station Well Field and Coyote Valley Ranch Well Fields Alternative:** Same as Proposed Action, except that the waterline from Coyote Valley Ranch Well Fields would extend 36 miles to the North Plant Site.
	Middle Well Field Alternative: 8,000 AFY from eight well sites in the middle portion of Steptoe Valley. The waterline would extend 30 miles to the South Plant Site.	**Middle Well Field Alternative:** Same as Proposed Action, except that the waterline from the Middle Well Field would extend 15 miles to the North Plant Site.
	South Well Field Alternative: 8,000 AFY from eight well sites in the southern portion of Steptoe Valley. The waterline would extend 8 miles to the South Plant Site.	**South Well Field Alternative:** Same as Proposed Action, except that the waterline from the South Well Field would extend 32 miles to the North Plant Site.
	Duck Creek Impoundment Water Supply Alternative: 8,000 AFY from the impoundment. No pumping stations would be required as the pipeline from Duck Creek would be gravity fed. Modifications to the existing dam, as well as new inlet and outlet structures, may be required to utilize this water source. Pipeline to the South Plant Site would be 6 miles.	
	Lages Station Well Field and Limited South Well Field Alternative: 5,000 AFY from Lages Station Well Field (6,000 gpm for six months and nothing for the remaining six months). 3,000 AFY from three wells adjacent to South Site. Pipeline to the South Plant Site would be 3 miles.	
		North Well Field Alternative: 8,000 AFY from five well sites adjacent to the North Plant Site. The waterline would extend 7 miles to the North Plant Site.

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES	SOUTH PLANT SITE (PROPOSED ACTION)	NORTH PLANT SITE ALTERNATIVE
	RAIL LINE	
	NNRy Upgrade: A new siding and lead (1.5 miles) would be built from the NNRy to the South Plant Site.	**NNRy Upgrade:** A new siding and lead (5.5 miles) would be built from the NNRy to the North Plant Site.
	Alternative Rail Line: If the NNRy is not available for rehabilitation, an alternative rail line that parallels the NNRy from the UPRR at Shafter and connecting directly to the South Plant Site would be constructed (approximately 100 miles long). A spur line interchange with the UPRR and associated yard facilities would be constructed and would require loading and unloading facilities approximately 2 miles in length.	**Alternative Rail Line:** Same as Proposed Action, except that the Alternative Rail Line would be 65 miles long.
One or two minor maintenance areas may be developed to provide railroad crews the ability to service right-of-way track facilities. The sites would be approximately 10 acres and may include small storage buildings, a yard area for storing ties, ballast and other track maintenance materials that may be necessary.		

2.6.2 Summary of Environmental Impacts

Table 2.6-2 provides a summary of the environmental impacts for the Proposed Action, the North Plant Site Alternative, and the No Action Alternative. **Tables 2.6-3a, 2.6-3b, 2.6-3c, and 2.6-3d** provide summaries of the environmental impacts of all of the Action Alternatives and the No Action Alternative.

TABLE 2.6-2. COMPARISON SUMMARY OF ENVIRONMENTAL IMPACTS FOR THE PROPOSED ACTION, NORTH PLANT SITE ALTERNATIVE, AND NO ACTION ALTERNATIVE

IMPACT		SOUTH PLANT SITE - PROPOSED ACTION (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NORTH PLANT SITE - ALTERNATIVE (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NO ACTION
Water Resources				
Acreage of wetlands impacts	ST	0	9.4	0
	LT	0	0.2	
General groundwater impacts from water supply operations		Decline (greater than 1 foot) in ground water would occur in an area approximately 84 square miles	Same as Proposed Action	None
Groundwater impacts affecting springs, streams and lakes		<2 Feet of drawdown beneath the northern, ephemeral reach of Duck Creek and Goshute Lake	Same as Proposed Action	None
Water rights impacted by drawdown		8 Active Water Rights potentially impacted, most predicted to be between 5 and 10 feet	Same as Proposed Action	None

IMPACT	**SOUTH PLANT SITE - PROPOSED ACTION** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	**NORTH PLANT SITE - ALTERNATIVE** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NO ACTION
Geology and Minerals			
Potential effects on topography	Minor	Minor	None
Number of mining, oil, gas, and/or geothermal claims potentially impacted	0	1	0
Paleontological Resources			
Potential to encounter paleontological resources	Low to High, depending on area Areas with high potential: Plant site, worker village, Mt. Wheeler transmission line, Robinson Summit substation, Lages Station well field, a portion of the waterline, and rail lead.	Same as Proposed Action	None
Soils			
Acreage Temporarily Disturbed	9,477	8,903	0
Acreage Permanently Disturbed	4,536	4,310	0

IMPACT	**SOUTH PLANT SITE - PROPOSED ACTION** **(INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)**	**NORTH PLANT SITE - ALTERNATIVE** **(INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)**	**NO ACTION**
Air Quality			
Would NAAQS be exceeded?	No	No	No
Operational impacts to Class I and sensitive Class II areas	• SO_2: Long-term, moderate • All others: Long-term, minor	Same as Proposed Action	None
Operational impacts to Class II areas	Plant site operations would not exceed federal and state limits for incremental degradation, and impacts combined with measured background concentrations would not approach national or Nevada ambient air quality standards.	Same as Proposed Action	None
Vegetation			
Five vegetation types with the most acreage permanently impacted, plus winterfat	• Black sagebrush – 1,339 • Douglas rabbitbrush – 1,701 • Greasewood – 127 • Salt desert shrub – 19.5 • Wyoming Sagebrush - 334 • Winterfat - 109	• Douglas rabbitbrush – 221 • Greasewood – 1,837 • Pinion-juniper – 121 • Salt desert shrub - 834 • Wyoming sagebrush – 524 • Winterfat - 35	0
Noxious and Non-native, invasive weed risk assessment	None to moderate, depending on area Areas of moderate risk: South plant site, worker village, Robinson Summit substation, Mt. Wheeler transmission line, Lages Station well field water supply, rail lead; transmission line segments 4A, 1D, and 11.	None to high, depending on area Area of high risk: Transmission line segment 1B Areas of moderate risk: Worker village, Robinson Summit substation, Mt. Wheeler transmission line, Lages Station well field water supply; transmission line segments 1C, 1D, and 11.	N/A

IMPACT	**SOUTH PLANT SITE - PROPOSED ACTION** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	**NORTH PLANT SITE - ALTERNATIVE** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NO ACTION
Special status plant species observation locations that could be impacted	Transmission line segments 6C and 9D	Same as Proposed Action	None
Wildlife Resources, Including Special Status Wildlife, Fisheries, and Aquatic Species			
Number of potentially occupied[1] sage grouse leks within 2 miles	• Transmission Lines - 19 • Water Supply Facilities – 3	Same as Proposed Action	0
Pygmy rabbit observation locations that could be impacted	• Worker village access road • Mt. Wheeler transmission line • Transmission line segments 4A, 1D, and 6C • Lages Station water pipeline	• Mt. Wheeler transmission line • Transmission line segments 1D and 6C • Lages Station water pipeline	None
Burrowing owl observation locations that could be impacted	• South plant site • Transmission line segment 4A • Lages Station water pipeline • Rail lead	• Lages Station water pipeline	None
Areas of pronghorn antelope range impacted	• South plant site, worker village, Mt. Wheeler transmission line • All transmission line segments north of segment 9C, excluding higher elevations • Lages Station well field and pipeline • Rail lead	• North plant site, worker village, Mt. Wheeler transmission line • All transmission line segments north of segment 9C, excluding higher elevations • Lages Station well field and pipeline • Rail lead	None

IMPACT	**SOUTH PLANT SITE - PROPOSED ACTION** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	**NORTH PLANT SITE - ALTERNATIVE** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NO ACTION
Impacts to fisheries and aquatic resources	None to negligible	Same as Proposed Action	None
Acres of desert tortoise habitat permanently impacted	81	Same as Proposed Action	0
Areas of mule deer crucial winter range impacts	• Mt. Wheeler transmission line • Portions of transmission line segments 1D, 4A, 6C, and 8.	• Mt. Wheeler transmission line • Portions of transmission line segments 1C, 1D, 6C, and 8.	None
Raptor nesting areas within 2 miles	• Ferruginous hawk: Worker village, transmission line segment 6C • Goshawk: Segment 4A	• Ferruginous hawk: North plant site, transmission line segment 6C • Goshawk: Segment 1C	N/A
Range Resources			
Number of allotments Impacted	39	35	0
Number of water sources potentially impacted	6	3	0

IMPACT	SOUTH PLANT SITE - PROPOSED ACTION (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NORTH PLANT SITE - ALTERNATIVE (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NO ACTION
Number of Horse Management Areas (HMAs) Impacted	7	9	0
Cultural Resources			
Number of or Projected Acres of NRHP-Eligible Sites impacted	South Plant Site: 0 sites Proposed Action Total: 18 sites + 454 acres	North Plant Site: 6 sites Alternative Total: 26 sites + 456 acres	0
Native American Concerns			
Number of Places of Cultural and/or Geographic Interest to Tribes potentially impacted	7	Same as Proposed Action	0
Land Use			
Acres of BLM lands affected by the project	16,889	17,292	0

IMPACT	**SOUTH PLANT SITE - PROPOSED ACTION** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	**NORTH PLANT SITE - ALTERNATIVE** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NO ACTION
Acres of private, state or other agency lands affected by the project	321	354	0
Acres of public lands transferred into private ownership	2,477	2,479	0
Special Designation Areas (SDAs)			
Number of SDAs where some portion of the SDA would have long-term noise impacts	4	2	0
Number of SDAs where some portion of the SDA would have long-term air quality-related reduced visibility	8	12	0

IMPACT	**SOUTH PLANT SITE - PROPOSED ACTION** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	**NORTH PLANT SITE - ALTERNATIVE** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NO ACTION
Number of SDAs with project components within their boundary	5	4	0
Number of SDAs where some portion of the SDA would have long-term impacts from noise, air quality, and viewshed.	3	2	0
Recreation			
Overall impact to recreation	Short-term, negligible to major Long-term, negligible to moderate	Short-term, negligible to major Long-term, negligible to minor	None
Visual Resources			
Developments potentially not consistent with BLM Visual Resource Management Classification designation	• Transmission Line Segment 6C	• Transmission Line Segment 6C	None

IMPACT		SOUTH PLANT SITE - PROPOSED ACTION (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NORTH PLANT SITE - ALTERNATIVE (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NO ACTION
Noise				
Noise impacts to nearest residence	ST	Minor to moderate	Minor to moderate	None
	LT	• Moderate in conjunction with plant site • Minor to moderate in conjunction with rail line and NNRy • Negligible for all other components	• Minor in conjunction with plant site • Minor to moderate in conjunction with rail line and NNRy • Negligible for all other components	
Noise impacts to Steptoe Valley	ST LT	Minor to moderate, resulting from increased population	Same as Proposed Action	None
Socioeconomics				
Peak annual economic impact [2]	ST	Plant: $124,923,000 – Year 4 Electric Transmission Facilities: $104,843,000 – Year 4 Water Facilities: $2,540,741 – Year 3	Same as Proposed Action	0
	LT	Plant: $22,738,000	Same as Proposed Action	
Estimated peak population increase	ST	Year 4 – 4,432	Same as Proposed Action	0
	LT	Year 7 - 805	Same as Proposed Action	
Peak fiscal impact to	ST	Year 2: Total Property Tax - $12,661,578 Sales and Use Tax – $18,761,700	Same as Proposed Action	0

IMPACT		**SOUTH PLANT SITE - PROPOSED ACTION** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 4A, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	**NORTH PLANT SITE - ALTERNATIVE** (INCLUDES PLANT SITE, ASSOCIATED WORKER VILLAGE, MT. WHEELER TRANSMISSION LINE, NNRY PLUS RAIL LEAD, LAGES STATION WELLFIELD AND WATER PIPELINE, ROBINSON SUMMIT AND HARRY ALLEN SUBSTATIONS, AND ELECTRIC TRANSMISSION SEGMENTS 1B, 1C, 1D, 1E, 6A, 6C, 8, 9A, 9B, 9C, 9D, AND 11)	NO ACTION
local gov't	LT	Year 6 Total Property Tax - $16,812,058 Total Sales and Use Tax – $637,536	Same as Proposed Action	
Cities or towns potentially impacted		Ely McGill	Ely McGill Wendover	None
Environmental Justice				
Disproportionate effects to minority or low income populations		None to negligible	Same as Proposed Action	None
Hazardous Materials and Solid Waste				
Anticipated environmental effects from use of hazardous materials		Negligible	Same as Proposed Action	None
Transportation				
Impacts to transporta -tion	ST	Minor to moderate	Same as Proposed Action	None
	LT	Negligible to minor	Same as Proposed Action	

[1] Includes active, inactive, and unknown leks.
[2] Peak economic impact would be the year of greatest economic impact realized from the project component. Economic impact of construction and operation of the rail lead connecting the plant site to the NNRy not estimated due to its proportionally negligible effect.

TABLE 2.6-3A. COMPARISON SUMMARY OF THE SOUTH PLANT SITE (PROPOSED ACTION) AND THE NORTH PLANT SITE ALTERNATIVE

IMPACT		UTILIZATION OF NNRY PLUS RAIL LEAD		ALTERNATIVE RAIL LINE		NO ACTION
		SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE (PROPOSED ACTION) [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	
Water Resources						
Acreage of wetlands impacts	ST	0	0	0	0	0
	LT	0	0	0	0	0
General groundwater impacts from water supply operations		N/A	N/A	N/A	N/A	N/A
Groundwater impacts affecting springs, streams and lakes		N/A	N/A	N/A	N/A	N/A
Water rights impacted by drawdown		N/A	N/A	N/A	N/A	N/A
Geology and Minerals						
Potential effects on topography		Negligible	Negligible	Negligible	Negligible	None
Number of mining, oil, gas, and/or geothermal claims potentially impacted		0	0	0	0	0

IMPACT	UTILIZATION OF NNRY PLUS RAIL LEAD		ALTERNATIVE RAIL LINE		NO ACTION
	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE (PROPOSED ACTION) [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	
Paleontological Resources					
Potential to encounter paleontological resources	High except for Mt. Wheeler Transmission Line	Mostly high with areas of low potential	High except for Mt. Wheeler Transmission Line and alternative rail line	Some high potential areas with areas of low potential	None
Soils					
Acreage Temporarily Disturbed	276	313	768	353	0
Acreage Permanently Disturbed	3,033	3,127	5,449	4,576	0
Air Quality					
Would NAAQS be exceeded?	No	No	No	No	No
Operational impacts to Class I and sensitive Class II areas	• SO_2: long-term, moderate • All others: long-term, minor	• Slightly less emissions due to shorter train route • Slightly more emissions due to longer worker commutes • Negligible difference overall	Same as for rail lead	Same as for rail lead	None

IMPACT	UTILIZATION OF NNRY PLUS RAIL LEAD		ALTERNATIVE RAIL LINE		NO ACTION
	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE (PROPOSED ACTION) [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	
Operational impacts to Class II areas	Plant site operations would not exceed federal or state incremental degradation limits; impacts plus background would not approach federal or state ambient air quality standards	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Vegetation					
Five vegetation types with the most acreage permanently impacted, plus winterfat	Black Sagebrush – 1,304 Disturbed - 3 Douglas Rabbitbrush – 1,612 Greasewood – 0.7 Wyoming Sagebrush - 15 Winterfat - 81	Douglas Rabbitbrush - 207 Greasewood – 1,719 Salt Desert Shrub – 834 Shadscale - 22 Wyoming Sagebrush – 300 Winterfat - 10	Black Sagebrush – 1,324 Douglas Rabbitbrush – 1,878 Greasewood – 347 Salt Desert Shrub - 118 Wyoming Sagebrush - 480 Winterfat - 96	Douglas Rabbitbrush – 315 Dune - 46 Greasewood – 1,936 Salt Desert Shrub - 907 Wyoming Sagebrush – 525 Winterfat - 17	N/A
Noxious and Non-native, invasive weed risk assessment	Moderate	Low Risk: North plant site, rail lead Moderate Risk: Worker village, Mt. Wheeler transmission line	Moderate	Low Risk: North plant site Moderate Risk: Worker village, Mt. Wheeler transmission line, alternative rail line	N/A
Special status plant species observation locations that could be impacted	None	None	None	None	N/A

IMPACT	UTILIZATION OF NNRY PLUS RAIL LEAD		ALTERNATIVE RAIL LINE		NO ACTION
	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE (PROPOSED ACTION)[1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	
Wildlife Resources, Including Special Status Wildlife, Fisheries, and Aquatic Species					
Number of potentially occupied[2] sage grouse leks within 2 miles	0	0	0	0	N/A
Pygmy rabbit observation locations that could be impacted	• Worker village access road • Mt Wheeler transmission line	• Mt Wheeler transmission line	• Worker village access road • Mt Wheeler transmission line	• Mt Wheeler transmission line	N/A
Burrowing owl observation locations that could be impacted	• South plant site • Rail lead	None	• South plant site • Private rail line	None	N/A
Areas of pronghorn antelope range impacted	All	All	All	All	N/A
Impacts to fisheries and aquatic resources	Negligible	Same as Proposed Action	South plant site & infrastructure – Negligible Alternative rail line - None	North plant site & infrastructure – Negligible Alternative rail line - None	None
Acres of Desert tortoise habitat permanently impacted	None	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	0

IMPACT	UTILIZATION OF NNRY PLUS RAIL LEAD		ALTERNATIVE RAIL LINE		NO ACTION
	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE (PROPOSED ACTION) [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	
Areas of mule deer crucial winter range impacts	Mt. Wheeler transmission line corridor	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Raptor nesting areas within 2 miles	Ferruginous hawk: Worker village	Ferruginous hawk: North plant site	Same as Proposed Action	Ferruginous hawk: North plant site	N/A
Range Resources					
Number of Allotments Impacted	9	9	14	13	0
Water source impacts	Plant: 6 water sources	Plant: 3 water sources	Plant: 6 water sources Alternative rail line: Access to water on 8 allotments	Plant: 3 water sources Alternative rail line: Access to water on Access to water on 8 allotments	0
Number of Horse Management Areas (HMAs) Impacted	0	2	3	3	0
Cultural Resources					
Projected Acres of NRHP-Eligible Prehistoric Sites impacted	0	19.06	18.1	35.12	0
Projected Acres of NRHP-Eligible Historic Sites impacted	0.3	0.1	2.1	1.8	0

IMPACT	UTILIZATION OF NNRY PLUS RAIL LEAD		ALTERNATIVE RAIL LINE		NO ACTION
	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE (PROPOSED ACTION) [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	
Native American Concerns					
Number of Places of Cultural and/or Geographic Interest to Tribes impacted	0	0	0	0	0
Land Use					
Acres of BLM lands affected by the project	3,449	150	5,889	4,982	0
Acres of private, state or other agency lands affected by the project	3,439	150	195	195	0
Acres of public lands transferred into private ownership	2,477	2,479	2,477	2,479	0
Special Designation Areas					
Number of SDAs where some portion of the SDA would have long-term noise impacts	6	6	9	9	0

IMPACT	UTILIZATION OF NNRY PLUS RAIL LEAD		ALTERNATIVE RAIL LINE		NO ACTION
	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE (PROPOSED ACTION) [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	
Number of SDAs where some portion of the SDA would have long-term air quality-related reduced visibility	9	12	9	12	0
Number of SDAs with project components within their boundary	4	4	4	4	N/A
Number of SDAs where some portion of the SDA would have long-term impacts from noise, air quality, and viewshed.	3	4	3	4	N/A
Recreation					
Overall impact to recreation	Short-term negligible to major, and long-term, negligible to moderate	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None

IMPACT		UTILIZATION OF NNRY PLUS RAIL LEAD		ALTERNATIVE RAIL LINE		NO ACTION
		SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE (PROPOSED ACTION) [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	
Visual Resources						
Developments potentially not consistent with BLM Visual Resource Management Classification designation		Transmission Line Segment 6C	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Noise						
Noise impacts to nearest residence	ST	• Plant site: minor to moderate • Transmission line: minor	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
	LT	• Plant site: Moderate • Transmission line: negligible	Same as Proposed Action	• Plant site: Minor • Transmission line: negligible	• Plant site: Minor • Transmission line: negligible	
Noise impacts to Steptoe Valley	ST LT	Minor to major due to population increase	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Socioeconomics						
Peak annual economic impact [3]	ST	Year 4: Plant: $124,923,000 Electric Transmission Facilities: $104,843,000	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None

IMPACT		UTILIZATION OF NNRY PLUS RAIL LEAD		ALTERNATIVE RAIL LINE		NO ACTION
		SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE (PROPOSED ACTION) [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	
	LT	Power Plant: $22,738,000	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	
Estimated peak population increase	ST	Year 4: 4,432	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
	LT	Years 7-50: 805	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	
Peak fiscal impact to local gov't	ST	Year 2: Total Property Tax: $12,661,578 Total Sales & Use: $18,761,700	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
	LT	Year 6: Total Property Tax: $16,812,058 Sales & Use Tax: $637,536	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	
Cities or towns potentially impacted		Ely & McGill	Ely & McGill	Ely & McGill	Ely & McGill	None
Environmental Justice						
Disproportion-ate effects to minority or low income populations		None to Negligible	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None

IMPACT		UTILIZATION OF NNRY PLUS RAIL LEAD		ALTERNATIVE RAIL LINE		NO ACTION
		SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE (PROPOSED ACTION) [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	SOUTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE [1]	NORTH PLANT SITE AND ASSOCIATED INFRASTRUCTURE[1]	
Hazardous materials and Solid Waste						
Anticipated environmental effects from use of hazardous materials		Negligible	Negligible	Negligible	Negligible	None
Transportation						
Impacts to trans-portation	ST	Minor, adverse	Same as Proposed Action	Minor, adverse	Minor, adverse	None
	LT	Plant site: Minor, adverse Rail Lead: beneficial	Same as Proposed Action	Plant site: Minor, adverse Alternative rail line: Minor, beneficial	Plant site: Minor, adverse Alternative rail line: Minor, beneficial	

[1] Includes Plant Site, associated Worker Village, and Mount Wheeler Transmission Line.
[2] Includes active, inactive, and unknown leks.
[3] Peak economic impact would be the year of greatest economic impact realized from the project component. Economic impact of construction and operation of the rail lead connecting the plant site to the NNRy not estimated due to its proportionally negligible effect.
ST- short-term
LT- long-term

TABLE 2.6-3B. COMPARISON SUMMARY OF ELECTRIC TRANSMISSION FACILITIES – PLANT SITES TO ROBINSON SUMMIT

IMPACT		SOUTH PLANT SITE TO ROBINSON SUMMIT[1, 2] (PROPOSED ACTION)	SOUTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 3[3, 4]	NORTH PLANT SITE TO ROBINSON SUMMIT[1, 5]	NORTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 1A[1,6]	NO ACTION
Water Resources						
Acreage of wetlands impacts	ST	0	9.4	9.4	9.4-18.8	0
	LT	0	0.2	0.2	0.2-0.4	0
General groundwater impacts from water supply operations		None	None	None	None	None
Groundwater impacts affecting springs, streams and lakes		None	None	None	None	None
Water rights impacted by drawdown		None	None	None	None	None
Geology and Minerals						
Potential effects on topography		Negligible	Same as Proposed Action	Minor	Minor	None
Number of mining, oil, gas, and/or geothermal claims potentially impacted		0	0	1 (Segment 1B)	0	0

IMPACT	SOUTH PLANT SITE TO ROBINSON SUMMIT[1, 2] (PROPOSED ACTION)	SOUTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 3[3, 4]	NORTH PLANT SITE TO ROBINSON SUMMIT[1, 5]	NORTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 1A[1,6]	NO ACTION
Paleontological Resources					
Potential to encounter paleontological resources	High potential – Robinson Summit	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Soils					
Acreage Temporarily Disturbed	908	1,334	1,296	1,292	0
Acreage Permanently Disturbed	232	154	256	252	0
Air Quality					
Would NAAQS be exceeded?	No	No	No	No	No
Operational impacts to Class I and sensitive Class II areas	Negligible	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Operational impacts to Class II areas	Negligible	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Vegetation					
Five vegetation types with the most acreage permanently impacted, plus winterfat	Black Sagebrush – 7 Douglas Rabbitbrush – 2 Pinyon-Juniper – 32 Shadscale 0.5 Wyoming Sagebrush – 102 Winterfat - 3	Black Sagebrush – 4 Burned / Fire Affected - 2 Douglas Rabbitbrush – 2 Pinyon-Juniper – 25 Wyoming Sagebrush – 34 Winterfat - 3	Alkaline Meadow – 0.8 Black Sagebrush – 9 Greasewood – 6 Pinon-Juniper - 29 Wyoming Sagebrush – 108 Winterfat - 3	Alkaline Meadow – 0.6 Douglas Rabbitbrush - 2 Greasewood – 1 Rubber Rabbitbrush – 0.1 Wyoming Sagebrush – 110 Winterfat -3	0

IMPACT	SOUTH PLANT SITE TO ROBINSON SUMMIT[1, 2] (PROPOSED ACTION)	SOUTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 3[3, 4]	NORTH PLANT SITE TO ROBINSON SUMMIT[1, 5]	NORTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 1A[1,6]	NO ACTION
Noxious and Non-native, invasive weed risk assessment	Low to moderate, depending on area Areas with moderate potential: Robinson Summit substation, Segments 4A, 1D	Low to high, depending on area Area with high potential: Segment 3 Areas with moderate potential: Segments 4A, 1D	Low to high, depending on area Area with high potential: Segment 1B Areas with moderate potential: Robinson Summit substation, Segments 1C and 1D	Low to moderate, depending on area Areas with moderate potential: Robinson Summit substation, Segments 1A, 1C, and 1D	N/A
Special status plant species observation locations that could be impacted	None	None	None	None	N/A
Wildlife Resources, Including Special Status Wildlife, Fisheries, and Aquatic Species					
Number of potentially occupied[7] sage grouse leks within 2 miles	7	8	4	5	N/A
Pygmy rabbit observation locations that could be impacted	Transmission line segments 4A and 1D	Same as Proposed Action	Transmission line segment 1D	Transmission line segment 1D	N/A
Burrowing owl observation locations that could be impacted	Segment 4A	Same as Proposed Action	None	None	N/A

IMPACT	SOUTH PLANT SITE TO ROBINSON SUMMIT[1, 2] (PROPOSED ACTION)	SOUTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 3[3, 4]	NORTH PLANT SITE TO ROBINSON SUMMIT[1, 5]	NORTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 1A[1,6]	NO ACTION
Areas of pronghorn antelope range impacted	All	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Impacts to fisheries and aquatic resources	None	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Acres of desert tortoise habitat permanently impacted	0	0	0	0	0
Areas of mule deer crucial winter range impacts	Segment 1D and 4A	Same as Proposed Action plus segment 3	Segment 1D	Segment 1D	None
Raptor nesting areas within 2 miles	Goshawk: Segment 4A	Same as Proposed Action	Goshawk: Segment 1C	Goshawk: Segment 1C	N/A
Range Resources					
Number of Allotments Impacted	5	8	10	11	0
Number of water sources potentially impacted	0	0	0	0	0
Number of Horse Management Areas (HMAs) Impacted	1	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	0

IMPACT	SOUTH PLANT SITE TO ROBINSON SUMMIT[1,2] (PROPOSED ACTION)	SOUTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 3[3,4]	NORTH PLANT SITE TO ROBINSON SUMMIT[1,5]	NORTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 1A[1,6]	NO ACTION
Cultural Resources					
Number of or Projected Acres of NRHP-Eligible Sites impacted	4 sites + 32.68 acres	1 site + 33.37 acres	9 sites + 33.51 acres	6 sites + 33.51 acres	0
Native American Concerns					
Number of Places of Cultural and/or Geographic Interest to Tribes impacted	1	Same as Proposed Action	1	1	0
Land Use					
Acres of BLM lands affected by the project	1,750	2,152	2,502	2,322	0
Acres of private, state or other agency lands affected by the project	0	29	63	0	0
Acres of public lands transferred into private ownership	0	0	0	0	0

IMPACT	SOUTH PLANT SITE TO ROBINSON SUMMIT[1, 2] (PROPOSED ACTION)	SOUTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 3[3, 4]	NORTH PLANT SITE TO ROBINSON SUMMIT[1, 5]	NORTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 1A[1,6]	NO ACTION
Special Designation Areas					
Number of SDAs where some portion of the SDA would have long-term noise impacts	0	0	0	0	0
Number of SDAs where some portion of the SDA would have long-term air quality-related reduced visibility	0	0	0	0	0
Number of SDAs with project components within their boundary	0	0	1 (PET)	1 (PET)	0
Number of SDAs where some portion of the SDA would have long-term impacts from noise, air quality, and viewshed.	0	0	0	0	0

IMPACT		SOUTH PLANT SITE TO ROBINSON SUMMIT[1, 2] (PROPOSED ACTION)	SOUTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 3[3, 4]	NORTH PLANT SITE TO ROBINSON SUMMIT[1, 5]	NORTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 1A[1,6]	NO ACTION
Recreation						
Overall impact to recreation		Short-term negligible to major; long-term negligible to minor	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Visual Resources						
Developments potentially not consistent with BLM Visual Resource Management Classification designation		None	None	None	None	None
Noise						
Noise impacts to nearest residence	ST	Minor to moderate	Same as Proposed Action	Negligible to moderate	Negligible to moderate	None
	LT	None	None	None	None	
Noise impacts to Steptoe Valley	ST	N/A	N/A	N/A	N/A	None
	LT	N/A	N/A	N/A	N/A	
Socioeconomics						
Peak annual economic impact[8]	ST	Year 4 - Plant: $124,923,000	Same as Proposed Action	Proposed Action Plus $8,923,237 in Years 1 & 2 (Table 4.17-15)	Proposed Action Plus $8,923,237 in Years 1 & 2 (Table 4.17-15)	0
	LT	Plant & Rail Line: $25,343,000	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	

IMPACT		SOUTH PLANT SITE TO ROBINSON SUMMIT[1, 2] (PROPOSED ACTION)	SOUTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 3[3, 4]	NORTH PLANT SITE TO ROBINSON SUMMIT[1, 5]	NORTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 1A[1,6]	NO ACTION
Estimated peak population increase	ST	Year 4: 4,432 (Table 4.17-6 & 4.17-7)	Same as Proposed Action	Proposed Action Plus 112 jobs in Year 1, 64 jobs in Year 2 (Table 4.17-15)	Proposed Action Plus 112 jobs in Year 1, 64 jobs in Year 2 (Table 4.17-15)	0
	LT	Years 7-50: 805 (Table 4.17-6)	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	
Peak fiscal impact to local gov't	ST	Year 2: Total Property Tax: $12,661,578 Total Sales & Use: $18,761,700	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	0
	LT	Year 6: Total Property Tax: $637,536; Total Sales & Use Tax: $16,812,058	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	
Cities or towns potentially impacted		Ely & McGill	Ely, McGill, & Wendover	Ely & McGill	Ely, McGill, & Wendover	None
Environmental Justice						
Disproportionate effects to minority or low income populations		None to negligible	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
Hazardous materials and Solid Waste						
Anticipated environmental effects from use of hazardous materials		Negligible	Same as Proposed Action	Negligible	Negligible	None

IMPACT		SOUTH PLANT SITE TO ROBINSON SUMMIT[1, 2] (PROPOSED ACTION)	SOUTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 3[3, 4]	NORTH PLANT SITE TO ROBINSON SUMMIT[1, 5]	NORTH PLANT SITE TO ROBINSON SUMMIT, ALTERNATIVE SEGMENT 1A[1,6]	NO ACTION
Transportation						
Impacts to transport-tation	ST	Temporary minor to moderate	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	None
	LT	Negligible	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	

[1] Assumes the construction of the Robinson Summit Substation.
[2] Components included here are Segments 4A, 1D, 1E, 6A and Robinson Summit Substation.
[3] Assumes Robinson Summit Substation is not constructed.
[4] Components included are Segments 4A, 1D, 1G, and 3.
[5] Components included here are Segments 1B, 1C, 1D, 1E, 6A and Robinson Summit Substation.
[6] Components included here are Segments 1A, 1C, 1D, 1E, 6A and Robinson Summit Substation.
[7] Includes active, inactive, and unknown leks.
[8] Peak economic impact would be the year of greatest economic impact realized from the project component.
ST- short-term
LT- long-term

TABLE 2.6-3C. COMPARISON SUMMARY OF ELECTRIC TRANSMISSION FACILITIES – ROBINSON SUMMIT TO HARRY ALLEN SUBSTATION

IMPACT		ROBINSON SUMMIT TO HARRY ALLEN[1, 2] (PROPOSED ACTION)	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 9A[2, 3]	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 10[2, 4]	NO ACTION
Water Resources					
Acreage of wetlands impacts	ST	0	0	0	0
	LT	0	0	0	0
General groundwater impacts from Lages Station well field		None	None	None	None
Groundwater impacts affecting springs, streams and lakes		None	None	None	None
Water rights impacted by drawdown		None	None	None	None
Geology and Minerals					
Potential effects on topography		Negligible	Same as Proposed Action	Same as Proposed Action	None
Number of mining, oil, gas, and/or geothermal claims potentially impacted		0	0	0	0
Paleontological Resources					
Potential to encounter paleontological resources		Minimized	Same as Proposed Action	Same as Proposed Action	None

IMPACT	ROBINSON SUMMIT TO HARRY ALLEN[1, 2] (PROPOSED ACTION)	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 9A[2, 3]	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 10[2, 4]	NO ACTION
Soils				
Acreage Temporarily Disturbed	7,109	7,114	7,424	0
Acreage Permanently Disturbed	834	842	838	0
Air Quality				
Would NAAQS be exceeded?	No	No	No	No
Operational impacts to Class I and sensitive Class II areas	Negligible	Same as Proposed Action	Same as Proposed Action	None
Operational impacts to Class II areas	Negligible	Same as Proposed Action	Same as Proposed Action	None
Vegetation				
Five vegetation types with the most acreage permanently impacted, plus winterfat	Blackbrush - 35 Creosote Bush - 83 Greasewood – 37 Pinon-Juniper - 92 Wyoming Sagebrush – 109 Winterfat - 22	Blackbrush - 26 Creosote Bush - 71 Greasewood – 37 Pinon-Juniper - 92 Wyoming Sagebrush – 109 Winterfat -21	Blackbrush - 26 Creosote Bush - 67 Greasewood – 37 Pinon-Juniper - 105 Wyoming Sagebrush – 109 Winterfat -21	N/A
Noxious and Non-native, invasive weed risk assessment	None to moderate, depending on area Area of moderate risk: Segment 11	Same as Proposed Action	Same as Proposed Action. Segment 10 poses a low risk	N/A

IMPACT	ROBINSON SUMMIT TO HARRY ALLEN[1, 2] (PROPOSED ACTION)	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 9A[2, 3]	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 10[2, 4]	NO ACTION
Special status plant species observation locations that could be impacted	Transmission line segments 6C, 9A, 9B, 9C, and 9D	Same as Proposed Action	Same as Proposed Action	N/A
Wildlife Resources, Including Special Status Wildlife, Fisheries, and Aquatic Species				
Number of potentially occupied[5] sage grouse leks within 2 miles	8	Same as Proposed Action	Same as Proposed Action	N/A
Pygmy rabbit observation locations that could be impacted	Transmission line Segment 6C	Same as Proposed Action	Same as Proposed Action	N/A
Burrowing owl observation locations that could be impacted	None	None	None	N/A
Areas of pronghorn antelope range impacted	Transmission line Segments 6C, 8, 9A, and 9B, excluding higher elevations	Same as Proposed Action	Same as Proposed Action	None
Impacts to fisheries and aquatic resources	None	Same as Proposed Action	Same as Proposed Action	None
Acres of desert tortoise habitat permanently impacted	81	Same as Proposed Action	45	0
Areas of mule deer crucial winter range impacts	Portions of transmission line Segments 6C and 8	Same as Proposed Action	Same as Proposed Action	None
Raptor nesting areas within 2 miles	Ferruginous hawk: transmission line Segment 6C	Same as Proposed Action	Same as Proposed Action	N/A

IMPACT	ROBINSON SUMMIT TO HARRY ALLEN[1, 2] (PROPOSED ACTION)	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 9A[2, 3]	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 10[2, 4]	NO ACTION
Range Resources				
Number of Allotments Impacted	24	Same as Proposed Action	27	0
Number of water sources potentially impacted	0	0	0	0
Number of Horse Management Areas (HMAs) Impacted	6	Same as Proposed Action	Same as Proposed Action	0
Cultural Resources				
Number or Sites or Projected Acres of NRHP-Eligible Sites impacted	405 acres	Same as Proposed Action	10 sites + 311 acres	0
Native American Concerns				
Number of Places of Cultural and/or Geographic Interest to Tribes impacted	6	Same as Proposed Action	6	0
Land Use				
Acres of BLM lands affected by the project	11,370	11,406	11,386	0
Acres of private, state or other agency lands affected by the project	41	41	37	0

IMPACT	ROBINSON SUMMIT TO HARRY ALLEN[1, 2] (PROPOSED ACTION)	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 9A[2, 3]	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 10[2, 4]	NO ACTION
Acres of public lands transferred into private ownership	0	0	0	0
Special Designation Areas				
Number of SDAs where some portion of the SDA would have long-term noise impacts	0	0	0	0
Number of SDAs where some portion of the SDA would have long-term air quality-related reduced visibility	0	0	0	0
Number of SDAs with project components within their boundary	3	3	3	0
Number of SDAs where some portion of the SDA would have long-term impacts from noise, air quality, and viewshed.	0	0	0	0
Recreation				
Overall impact to recreation	Short-term negligible to major; long-term negligible to minor	Same as Proposed Action	Same as Proposed Action	None

IMPACT		ROBINSON SUMMIT TO HARRY ALLEN[1, 2] (PROPOSED ACTION)	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 9A[2, 3]	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 10[2, 4]	NO ACTION
Visual Resources					
Developments potentially not consistent with BLM Visual Resource Management Classification designation		Segment 6C	Segment 6C	Segment 6C and 10	None
Noise					
Noise impacts to nearest residences	ST	Minor to moderate	Same as Proposed Action	Minor to moderate	None
	LT	None	None	None	
Noise impacts to Steptoe Valley	ST	N/A	N/A	N/A	None
	LT	N/A	N/A	N/A	
Socioeconomics					
Peak annual economic impact[6]	ST	N/A	Same as Proposed Action	Same as Proposed Action	None
	LT	N/A	Same as Proposed Action	Same as Proposed Action	
Estimated peak population increase	ST	N/A	Same as Proposed Action	Same as Proposed Action	None
	LT	Negligible	Same as Proposed Action	Same as Proposed Action	
Peak fiscal impact to local gov't	ST	N/A	Same as Proposed Action	Same as Proposed Action	None
	LT	N/A	Same as Proposed Action	Same as Proposed Action	
Cities or towns potentially impacted		Ely & McGill	Same as Proposed Action	Same as Proposed Action	None

IMPACT		ROBINSON SUMMIT TO HARRY ALLEN[1, 2] (PROPOSED ACTION)	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 9A[2, 3]	ROBINSON SUMMIT TO HARRY ALLEN, SEGMENT 10[2, 4]	NO ACTION
Environmental Justice					
Disproportionate effects to minority or low income populations		None to Negligible	Same as Proposed Action	Same as Proposed Action	None
Hazardous materials and Solid Waste					
Anticipated environmental effects from use of hazardous materials		Negligible	Same as Proposed Action	Negligible	None
Transportation					
Impacts to transportation	ST	Temporary minor to moderate	Same as Proposed Action	Same as Proposed Action	None
	LT	Negligible	Same as Proposed Action	Same as Proposed Action	

[1] Under the Proposed Action, both lines would occur within the SWIP corridor, with the exception of Line #1 being routed through Segment 9A. Components included here are Segments 6C, 8, 9A, 9B, 9C, 9D, and 11.
[2] Acreage figures also include expansion of Harry Allen Substation.
[3] Under this alternative both lines would be within the Segment 9A corridor. Therefore, components included here are segments 6C, 8, 9B, 9A, 9D, and 11.
[4] Under this alternative, Line #1 would be routed through Segment 9A and 9B, and Line #2 would be routed through Segment 10. Components included here are segments 6C, 8, 9A, 9B, 10, and 11.
[5] Includes active, inactive, and unknown leks.
[6] Peak economic impact would be the year of greatest economic impact realized from the project component.
ST- short-term
LT – long-term

TABLE 2.6-3D. COMPARISON SUMMARY OF WATER SUPPLY FACILITIES

IMPACT		WATER SUPPLY FACILITIES[1]											
		SOUTH PLANT SITE						NORTH PLANT SITE ALTERNATIVE					
		LAGES STATION (PRO-POSED ACTION)	DUCK CREEK IMPNDMT	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	RED. LAGES W/ LTD SOUTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	LAGES STATION	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	NORTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	NO ACTION
Water Resources													
Acreage of wetlands impacts	ST	0	0	0	0	0	0	0	0	0	0	0	0
	LT	0	uncertain	uncertain	uncertain	0	uncertain	0	uncertain	0	0	uncertain	0
General groundwater impacts from water supply operations		83 sq miles	NA	104 sq miles	107 sq miles	19 sq miles	35 sq miles	Same as South Plant Site	Same as South Plant Site	37 sq miles	Same as South Plant Site	Same as South Plant Site	None
Groundwater impacts affecting springs, streams and lakes		0	Seasonal reduction to Duck Creek	0	0	0	0	0	0	0	0	0	None
Water rights impacted by drawdown		8	None	17	18	1	5	8	17	7	1	5	None
Geology and Minerals													
Potential effects on topography		Minor						Negligible					
Number of mining, oil, gas, and/or geothermal claims potentially impacted		0						0					

IMPACT	WATER SUPPLY FACILITIES[1]											
	SOUTH PLANT SITE						NORTH PLANT SITE ALTERNATIVE					
	LAGES STATION (PRO-POSED ACTION)	DUCK CREEK IMPNDMT	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	RED. LAGES W/ LTD SOUTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	LAGES STATION	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	NORTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	NO ACTION
Paleontological Resources												
Potential to encounter paleontological resources	High Potential	High Potential	High Potential	High Potential	Unlikely	High Potential	Same as Proposed Action	High Potential	Sensitive	Unlikely	High Potential	None
Soils												
Acreage[1] Temporarily Disturbed[2]	834	94	849	834	506	133	255	873	120	253	552	0
Acreage[1] Permanently Disturbed[2]	367	40	382	367	217	58	118	391	51	109	237	0
Air Quality												
Would NAAQS be exceeded?	No						No					No
Operational impacts to Class I and sensitive Class II areas	Negligible	Same as Proposed Action					Same as Proposed Action					None
Operational impacts to Class II areas	Negligible	Same as Proposed Action					Same as Proposed Action					None

IMPACT	WATER SUPPLY FACILITIES[1]											
	SOUTH PLANT SITE						NORTH PLANT SITE ALTERNATIVE					
	LAGES STATION (PRO-POSED ACTION)	DUCK CREEK IMPNDMT	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	RED. LAGES W/ LTD SOUTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	LAGES STATION	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	NORTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	NO ACTION
Vegetation												
Five vegetation types with the most acreage permanently impacted, plus winterfat	Douglas Rabbitbrush – 74 Greasewood – 89 Rubber Rabbitbrush - 29 Salt Desert Shrub – 19 Wyoming Sagebrush – 108 Winterfat - 3	Black Sagebrush – 1 Disturbed – 10 Douglas Rabbitbrush – 8 Greasewood – 0 Salt Desert Shrub / Rubber Rabbitbrush – 3 ea. Wyoming Sagebrush – 12 Winterfat -0	Douglas Rabbitbrush – 74 Greasewood –71 Rubber Rabbitbrush - 19 Salt Desert Shrub - 19 Wyoming Sagebrush – 112 Winterfat -3	Douglas Rabbitbrush – 74 Greasewood – 63 Salt Desert Shrub – 19 Rubber Rabbitbrush - 29 Wyoming Sagebrush – 108 Winterfat -3	Black Sagebrush / Shadscale – 2 ea. Douglas Rabbitbrush – 69 Greasewood – 15 Rubber Rabbitbrush 24 Wyoming Sagebrush – 91 Winterfat -3	Alkaline Meadow - 8 Douglas Rabbitbrush – 27 Greasewood – 6 Rubber Rabbitbrush - 9 Wyoming Sagebrush – 5 Winterfat -3	Douglas Rabbitbrush - 0 Dune – 1 Greasewood – 76 Rubber Rabbitbrush 0 6 Wyoming Sagebrush – 7 Winterfat -0	Douglas Rabbitbrush - 56 Greasewood – 67 Rubber Rabbitbrush - 17 Shadscale - 3 Wyoming Sagebrush – 108 Winterfat -0	Dune - 1 Greasewood – 37 Rubber Rabbitbrush - 6 Wyoming Sagebrush – 7 Winterfat -0	Black Sagebrush – 2 Disturbed – 1 Douglas Rabbitbrush - 56 Shadscale – 2 Wyoming Sagebrush – 47 Winterfat -0	Alkaline Meadow – 8 Douglas Rabbitbrush - 76 Greasewood – 15 Rubber Rabbitbrush – 25 Wyoming Sagebrush – 103 Winterfat -3	0
Noxious and Non-native invasive weed risk assessment	Moderate	High	Moderate	Moderate	Low	Low	Moderate	Moderate	Low	Low	Moderate	N/A
Special status plant species observation locations that could be impacted	None						None					N/A
Wildlife Resources, Including Special Status Wildlife, Fisheries, and Aquatic Species												
Number of potentially occupied[3] sage grouse leks within 2 miles	3	0	0	0	2	1	3	0	0	2	1	N/A

<table>
<tr><th rowspan="3">IMPACT</th><th colspan="12">WATER SUPPLY FACILITIES[1]</th></tr>
<tr><th colspan="6">SOUTH PLANT SITE</th><th colspan="5">NORTH PLANT SITE ALTERNATIVE</th><th></th></tr>
<tr><th>LAGES STATION (PRO-POSED ACTION)</th><th>DUCK CREEK IMPNDMT</th><th>RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.</th><th>RED. LAGES W/ LTD SOUTH WELL FLD.</th><th>MIDDLE WELL FLD.</th><th>SOUTH WELL FLD.</th><th>LAGES STATION</th><th>RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.</th><th>NORTH WELL FLD.</th><th>MIDDLE WELL FLD.</th><th>SOUTH WELL FLD.</th><th>NO ACTION</th></tr>
<tr><td>Pygmy rabbit observation locations that could be impacted</td><td colspan="6">No</td><td colspan="5">No</td><td>N/A</td></tr>
<tr><td>Burrowing owl observation locations that could be impacted</td><td colspan="6">No</td><td colspan="5">No</td><td>N/A</td></tr>
<tr><td>Areas of pronghorn antelope range impacted</td><td colspan="6">Yes</td><td colspan="5">Yes</td><td>None</td></tr>
<tr><td>Impacts to fisheries and aquatic resources</td><td colspan="6">None</td><td colspan="5">None</td><td>None</td></tr>
<tr><td>Acres of desert tortoise habitat permanently impacted</td><td colspan="6">0</td><td colspan="5">0</td><td>0</td></tr>
<tr><td>Areas of mule deer crucial winter range impacts</td><td>No</td><td>Yes</td><td>No</td><td>No</td><td>No</td><td>No</td><td colspan="5">No</td><td>None</td></tr>
<tr><td>Raptor nesting areas within 2 miles</td><td colspan="6">None</td><td colspan="5">None</td><td>N/A</td></tr>
</table>

IMPACT	WATER SUPPLY FACILITIES[1]											
	SOUTH PLANT SITE						NORTH PLANT SITE ALTERNATIVE					
	LAGES STATION (PRO-POSED ACTION)	DUCK CREEK IMPNDMT	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	RED. LAGES W/ LTD SOUTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	LAGES STATION	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	NORTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	NO ACTION
Range Resources												
Number of Allotments Impacted	N/A	3	6	6	5	2	N/A	6	1	5	6	0
Number of water sources potentially impacted	3						Same as Proposed Action					0
Number of Horse Management Areas (HMAs) Impacted	1	0	1	1	0	0	1	1	0	0	0	0
Cultural Resources												
Number of and/or Projected Acres of NRHP-Eligible Prehistoric Sites impacted	11 sites + 16.32 acres	2 sites	11 sites + 16.32 acres	11 sites + 16.32 acres	4 sites	3 sites	7 sites + 16.32 acres	8 sites + 16.32 acres	7 sites	1 site	11 sites	0
Native American Concerns												
Number of Places of Cultural and/or Geographic Interest to Tribes impacted	0						0					0

IMPACT	WATER SUPPLY FACILITIES[1]											
	SOUTH PLANT SITE						NORTH PLANT SITE ALTERNATIVE					
	LAGES STATION (PRO-POSED ACTION)	DUCK CREEK IMPNDMT	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	RED. LAGES W/ LTD SOUTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	LAGES STATION	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	NORTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	NO ACTION
Land Use												
Acres of BLM lands affected by the project	320	44	323	320	218	58	51	240	51	109	233	0
Acres of private, state or other agency lands affected by the project	130	26	22	102	0	0	130	6	0	0	0	0
Acres of public lands transferred into private ownership	0						0					0
Special Designation Areas												
Number of SDAs where some portion of the SDA would have long-term noise impacts	0						0					0
Number of SDAs where some portion of the SDA would have long-term air quality-related reduced visibility	0						0					0

IMPACT	WATER SUPPLY FACILITIES[1]											
	SOUTH PLANT SITE						NORTH PLANT SITE ALTERNATIVE					
	LAGES STATION (PRO-POSED ACTION)	DUCK CREEK IMPNDMT	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	RED. LAGES W/ LTD SOUTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	LAGES STATION	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	NORTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	NO ACTION
Number of SDAs with project components within their boundary	1 (PET)						1 (PET)					0
Number of SDAs where some portion of the SDA would have long-term impacts from noise, air quality, and viewshed.	0						0					0
Recreation												
Overall impact to recreation	Short-term negligible to minor; long-term negligible						Short-term negligible to minor; long-term negligible					None
Visual Resources												
Developments potentially not consistent with BLM Visual Resource Management Classification designation	None						None					None

IMPACT		WATER SUPPLY FACILITIES[1]												
		SOUTH PLANT SITE						NORTH PLANT SITE ALTERNATIVE						
		LAGES STATION (PROPOSED ACTION)	DUCK CREEK IMPNDMT	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	RED. LAGES W/ LTD SOUTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	LAGES STATION	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	NORTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	NO ACTION
Noise														
Noise impacts to nearest residence	ST	Minor	Moderate to major	Same as Proposed Action				Same as Proposed Action					None
	LT	Negligible	Same as Proposed Action					Same as Proposed Action					
Noise impacts to Steptoe Valley	ST	N/A						N/A					None
	LT	N/A						N/A					
Socioeconomics														
Peak annual economic impact[4]	ST	Year 4: Plant: $124,923,000 Water Supply Facilities: $2,540,741	Same as Proposed Action					Same as Proposed Action					0
	LT	Power Plant: $22,738,000	Same as Proposed Action					Same as Proposed Action					
Estimated peak pop. increase	ST	Year 4: 3,611 (Table 4.17-6 & 4.17-7)	Same as Proposed Action					Same as Proposed Action					0
	LT	Years 7-50: 698 (Table 4.17-6 & 4.17-11)	Same as Proposed Action					Same as Proposed Action					

IMPACT		WATER SUPPLY FACILITIES[1]												
		SOUTH PLANT SITE						NORTH PLANT SITE ALTERNATIVE						
		LAGES STATION (PRO-POSED ACTION)	DUCK CREEK IMPNDMT	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	RED. LAGES W/ LTD SOUTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	LAGES STATION	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	NORTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	NO ACTION
Peak fiscal impact to local gov't	ST	Year 2: Total Property Tax: $12,661,578 Total Sales & Use Tax: $18,761,700	Same as Proposed Action					Same as Proposed Action					0
	LT	Year 6: Total Property Tax: $637,536 Sales & Use Tax: $16,812,058	Same as Proposed Action					Same as Proposed Action					
Cities or towns potentially impacted		Ely & McGill	Ely & McGill	Ely & McGill	Ely & McGill	Ely & McGill	Ely & McGill	Ely, McGill & Wendover	Ely, McGill & Wendover	Ely, McGill & Wendover	Ely, McGill & Wendover	Ely, McGill & Wendover	None
Environmental Justice													
Disproportionate effects to minority or low income populations		None to negligible	Same as Proposed Action					Same as Proposed Action					None
Hazardous materials and Solid Waste													
Anticipated environmental effects from use of hazardous materials		Negligible	Same as Proposed Action					Same as Proposed Action					None

IMPACT		WATER SUPPLY FACILITIES[1]												
		SOUTH PLANT SITE						NORTH PLANT SITE ALTERNATIVE					
		LAGES STATION (PRO-POSED ACTION)	DUCK CREEK IMPNDMT	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	RED. LAGES W/ LTD SOUTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	LAGES STATION	RED. LAGES W/ COYOTE VALLEY RANCH WELL FLD.	NORTH WELL FLD.	MIDDLE WELL FLD.	SOUTH WELL FLD.	NO ACTION
Transportation													
Impacts to trans-portation	ST	Negligible						Same as Proposed Action					None
	LT	Negligible						Same as Proposed Action					

[1] Acreage calculations include estimates for the water supply facilities and all associated pipelines.
Note: Pipeline lengths will vary by plant site, thus impacts to resources from the various water sources may vary correspondingly.
[2] Taken from Tables 4.5-3 and 4.5-7.
[3] Includes active, inactive, and unknown leks.
[4] Peak economic impact would be the year of greatest economic impact realized from the project component.
ST- short-term
LT- long-term

2.7 Monitoring and Mitigation

2.7.1 Water Resources

Additional mitigation measures are not required.

2.7.2 Geology and Minerals

Additional mitigation measures are not required.

2.7.3 Paleontological Resources

1. A trained paleontological monitor will be present during ground-disturbing activities within the project area in sediments determined through pre-construction surveys as being likely to contain significant paleontological resources (i.e., high paleontological sensitivity).
2. Upon encountering scientifically significant paleontological resources, salvage of bone will be conducted with additional field staff and in accordance with modern paleontological techniques.
3. Fossils collected during the project will be prepared to a reasonable point of identification.
4. A report documenting the results of the monitoring and salvage activities and the significance of the fossils will be prepared.
5. Fossils collected during this work, along with the itemized inventory of these specimens, will be deposited in a museum repository for permanent curation and storage.

2.7.4 Soils

1. Ensure that soils are hauled and there is placement of growth medium to sites ready for immediate reclamation to minimize the need for stockpiling the material. The underlying subsoil material will remain in place or be disposed elsewhere.
2. Design access roads to fit the terrain by avoiding unstable slopes and highly erodible conditions to the extent practicable to protect soils and prevent excessive sedimentation. These protective measures include, but are not limited to, mulch, matting, or slope length shortening (State of Nevada 1994).
3. When soils are wet, construction, operation, and maintenance activities are to be restricted so as to properly support construction or maintenance equipment (i.e., when heavy equipment creates ruts in excess of 4 inches deep over a distance of 100 feet or more in wet or saturated soils). This standard will not apply in areas with silty soils, which easily form depressions even in dry weather. Where the soil is deemed too wet, one or more of the following measures will apply:
    - Re-route all construction or maintenance activities around the wet areas so long as the route does not cross into sensitive resource areas.
    - If wet areas cannot be avoided, implement BMPs for use in these areas during construction and improvement of access roads, and their subsequent reclamation. This includes use of wide-track or balloon-tire vehicles and

equipment, or other weight dispersing systems approved by the appropriate resource agencies. It also may include use of geotextile cushions, pre-fabricated equipment pads, and other materials to minimize damage to the substrate where determined necessary by resource specialists.

- Limit access of construction equipment to the minimum amount feasible, remove and separate topsoil in wet or saturated areas and stabilize subsurface soils with a combination of one or more of the following: grading to dewater problem areas, utilize weight dispersion mats, and maintain erosion control measures such as surface filling and back-dragging. After construction is complete, re-grade and re-contour the area, replace topsoil, and reseed to achieve the required plant densities.

4. Vegetation is to be cleared and the construction ROW is to be graded only to the extent necessary. Vegetation within the ROW is to be cut or scraped at or near the ground level. Except for the area to be excavated, the vegetative root system and subsurface soils are to be left intact to the greatest extent practicable. This will help stabilize the soils within the ROW during construction. ROW boundaries are to be clearly staked or flagged and no disturbance are allowed beyond the limits.

2.7.5 Air Resources

1. For project construction outside the power plant site, construction staging areas will be placed no closer than 500 feet of residences.
2. Car pooling will be encouraged by project proponents during construction and operation of the EEC and associated project development.
3. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard, which is the distance from the top of the truck bed in the material being hauled.
4. Sweep streets of visible soil material carried onto adjacent paved public streets.

2.7.6 Vegetation, Including Noxious and Non-Native, Invasive Weeds and Special Status Plants

1. Safely store salvageable cacti and yucca in temporary plant storage sites, and plant salvage from areas of permanent disturbance is to be moved once, and replanted as during revegetation/reclamation activities.
2. Site-specific and targeted special status plant surveys are to be conducted during the appropriately timed survey window, prior to final siting of electric transmission line pole structures and equipment staging areas. If communities of special status plant species are present at a given pole location or staging area, all efforts to relocate that pole or staging area are to be made to avoid such plants to the extent practicable. If relocating a specific pole or staging area is entirely not feasible due to operational constraints and requirements, the individuals and/or community of special status plants to be impacted are to be transplanted.

2.7.7 Wildlife, Including Special Status Wildlife, Migratory Birds, Fisheries, and Aquatic Species

1. Banded Gila Monster Mitigation Measures

Banded Gila monsters can occur within the southern portion of the Project Area in southern Lincoln and northern Clark Counties. Measures provided by NDOW in a November 1, 2007 publication entitled *Gila Monster Status, Identification and Reporting Protocol for Observations* are to be followed by the Proponent and their private contractors so as to minimize impacts on the Gila monster associated with the electric transmission facilities:

- Live Gila monsters found in harms way on the construction site will be captured and then detained in a cool, shaded environment (<85°F) by the project biologist or equivalent personnel until a NDOW biologist can arrive for documentation, marking and obtaining biological measurements and samples prior to releasing. Despite that a Gila monster is venomous and can deliver a serious bite, its relatively slow gate allows for it to be easily coaxed or lifted into an open bucket or box carefully using a long handled instrument such as a shovel or snake hook (*Note: it is not the intent of NDOW to request unreasonable action to facilitate captures; additional coordination with NDOW will clarify logistical points*). A clean 5-gallon plastic bucket w/ a secure, vented lid; an 18"x 18"x 4" plastic sweater box w/ a secure, vented lid; or, a tape-sealed cardboard box of similar dimension may be used for safe containment. Additionally, written information identifying the mapped capture location, Global Positioning System (GPS) coordinates in Universal Transverse Mercator (UTM) using the North American Datum (NAD) 83 Zone 11. Date, time, and circumstances (e.g. biological survey or construction) and habitat description (vegetation, slope, aspect, substrate) will also be provided to NDOW.
- Injuries to Gila monsters may occur during excavation, blasting, road grading, or other construction activities. In the event a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Rehabilitation or euthanasia expenses will not be covered by NDOW. However, NDOW will be immediately notified of any injury to a Gila monster and which veterinarian is providing care for the animal. If an animal is killed or found dead, the carcass will be immediately frozen and transferred to NDOW with a complete written description of the discovery and circumstances, date, time, habitat, and mapped location (GPS coordinates in UTM using NAD 83 Z 11).
- Should NDOW's assistance be delayed, biological or equivalent acting personnel on site should detain the Gila monster out of harms way until NDOW personnel can respond. The Gila monster should be detained until NDOW biologists have responded. Should NDOW not be immediately available to respond for photo-documentation, a digital (5 megapixle or higher) or 35mm camera will be used to take good quality images of the Gila monster in situ at the location of live encounter or dead salvage. The pictures will be provided to NDOW at the address above or the email address below along with specific location information including GPS coordinates in UTM using NAD 83 Z 11, date, time and habitat description. Pictures will show the following information: (1) Encounter location (landscape with Gila monster in clear view); (2) a clear overhead shot of the entire body with a ruler next to it for scale (Gila monster should fill camera's field of view and be in sharp focus); (3) a clear, overhead close-up of the head (head should fill camera's field of view and be in sharp focus).

2. Greater Sage Grouse Mitigation Measures

In order to minimize the possibility of disruption of mating strategies and unintentional take of greater sage grouse, the Proponent will employ the following:

- Outside of the designated SWIP corridor, construction activities are to be restricted during the period from March 1 through May 15 within two miles of active greater sage grouse leks.
- Outside of the designated SWIP corridor, construction activities will be restricted from November 1 through March 31 within greater sage grouse winter range.
- In order to minimize an increase in predation of greater sage grouse, design features will be incorporated into the high-voltage (>200kV) electric transmission towers that will deter raptors and common ravens from utilizing the transmission towers as hunting facilitators. Non-lattice structures will be installed at locations within two miles of active leks and identified greater sage grouse winter range.

3. Avian Wildlife Mitigation Measures

For a complete list of protected birds see 50 C.F.R. 10.13.

A. Migratory Birds

- Land disturbing construction and vegetation clearing activities are to be scheduled outside of the breeding season (March 15 through July 30 - in upland desert habitats and ephemeral washes containing upland species and March 1 through August 30 - in riparian and higher elevation areas). Where construction is required during the breeding season, the area impacted will be surveyed for nests prior to construction. If no nests were found, construction could proceed. Project area surveys will be done to ensure 100 percent coverage. Methods will be selected based on the plant community and/or topography. Field notes and reports will thoroughly describe methodology and rationale for use and archived.
- If active migratory bird nests (i.e. contains eggs or young) are encountered during the surveys, land disturbing construction activities are to be avoided while the birds are allowed to fledge. An appropriate construction avoidance buffer area, to be determined for the species and in conjunction with the BLM, will apply to all active nests for migratory bird species.

B. Western Burrowing Owls and Ground Nesting Species

- Surveys are to include burrowing owls and other ground nesting species. If active nests containing eggs and/or young were to be found, then an appropriately-sized buffer area will be established, marked and avoided during construction so that egg laying, incubation and the rearing of young continues until such time as the young fledge.
- For construction activities from October 1 to March 14, the Proponent's biologist will collapse all burrows, holes, crevices, or other cavities on the construction site only after thoroughly inspecting them for inhabitants, in accordance with agency protocols. This will discourage burrowing owls from potentially occupying the burrows, holes, crevices before and during construction activities.
- If burrowing owls are observed during surveys after March 15, the wildlife biologist is to be notified. The wildlife biologist will rely on behavioral observations to determine their breeding status. Should breeding behavior be observed, the wildlife biologist assumes

that an active nest is present and the area will be avoided until the young fledge. This ensures that any eggs or young are not abandoned due to project activities. The owl's total nesting cycle takes a minimum of 74 days, during which time construction activity needs to cease within the buffer area on the site. Generally, owl eggs may be laid between mid-March to the end of May, and young may be present from mid-April through August. (Adapted from USFWS recommendations)

C. Raptors

- Raptor nests within the project area are to be identified during pre-construction surveys for migratory and ground-nesting birds. All active raptor nests are to be avoided. Known raptor nest sites need to be checked two to five days prior to construction activities in a given area. If an active raptor nest site is discovered, construction activities are to be restricted within 0.5 miles of the active nest site from May 1 through July 15.

4. Big Game Mitigation/Management Action Measures

The following Management Actions will be evaluated and potentially implemented for construction activities in specific big game habitats mapped outside the designated SWIP corridor as specified below:

A. Big Game Calving/Fawning/Kidding/Lambing Grounds and Crucial Summer Range

Construction activities are to be restricted within big game calving/fawning/kidding/lambing grounds and crucial summer range from April 15 through June 30.

B. Big Game Crucial Winter Range

Construction activities are to be restricted within crucial winter range from November 1 through March 31.

C. Desert Bighorn Sheep Habitat

Construction activities are to be restricted within occupied desert bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.

5. General Wildlife and Special Status Species Habitat

The loss of aquatic, priority wildlife, and/or special status species habitats will be mitigated on a ratio of two acres of comparable habitat for every one acre of lost habitat in areas outside the designated SWIP corridor.

2.7.8 Range

1. The Proponents are to meet with affected livestock permittees to determine appropriate mitigation measures that could be applied to specific areas impacted by construction and operation of the proposed facilities.

2.7.9 Cultural Resources

1. If previously unidentified cultural resources are discovered, all EEC-related activities within 50 meters (165 ft) of the discovery shall cease immediately (EEC Programmatic Agreement). The Proponent or its authorized representative shall secure the location to prevent vandalism or other damage. The Proponent, or their authorized representative, shall notify the BLM Authorized Officer of the discovery within 24 hours by telephone followed by written confirmation. Activity at the location shall be suspended until after

the discovery has been evaluated and any necessary mitigation measures completed and BLM has issued a written Notice to Proceed.

2. Any human remains, grave goods, items of cultural patrimony, and sacred objects, encountered during the undertaking are to be treated with the respect due such materials. Human remains and associated grave offerings found on public land are to be handled according to the provisions of NAGPRA and its implementing regulations (43 CFR 10). Human remains and associated grave offerings found on state or private land will be handled according to the provisions of Nevada statute NRS 383.

2.7.10 Native American Concerns

1. If previously unidentified cultural resources are discovered, all EEC-related activities within 50 meters (165 ft) of the discovery are to cease immediately (EEC Programmatic Agreement) and the Proponent or its authorized representative shall secure the location to prevent vandalism or other damage. The Proponent, or their authorized representative, shall notify the BLM Authorized Officer of the discovery within 24 hours by telephone followed by written confirmation. Activity at the location shall be suspended until after the discovery has been evaluated and any necessary mitigation measures completed and BLM has issued a written Notice to Proceed.
2. Any human remains, grave goods, items of cultural patrimony, and sacred objects, encountered during the undertaking will be treated with the respect due such materials. In coordination with the Programmatic Agreement, human remains and associated grave offerings found on public land will be handled according to the provisions of NAGPRA and its implementing regulations (43 CFR 10). Human remains and associated grave offerings found on state or private land will be handled according to the provisions of Nevada statute NRS 383.

2.7.11 Land Use and Realty

Additional mitigation measures are not required.

2.7.12 Special Designations

Additional mitigation measures are not required.

2.7.13 Recreation

1. Construction schedules are to be coordinated with permitted activities within the Loneliest Highway and Paranaghat SRMAs, and the Alamo and Ely SRP Areas so as to avoid conflicts.

2.7.14 Visual

Additional mitigation measures are not required.

2.7.15 Noise

1. For project construction outside the power plant site, construction staging areas are to be placed no closer than 500 feet of residences. The schedule for all project construction activity is to preclude the use of heavy equipment, including those with the largest construction noise producing capability, between 10 PM and 7 AM within 2 miles of sensitive receptors. The power plant and support facilities is to be maintained for efficient operation, and operated with consideration for noise impacts to off-site residences as well.

2.7.16 Socioeconomics

1. The Proponents have entered into a cooperative agreement with White Pine County and other local community agencies to review potential adverse socioeconomic impacts to local community services and develop mutually agreeable approaches to mitigation of these impacts prior to the issuance of ROWs. These agreements on mitigation are outside the scope of this EIS, but could address the adverse impacts identified in this document when established. The County will coordinate with the BLM on these matters so the BLM becomes aware of the mitigation measures agreed to by the parties to the cooperative agreement.
2. The Proponents are to remove the worker village upon completion of construction to ensure that it does not create a housing surplus that will adversely affect the local housing market.

2.7.17 Environmental Justice

Additional mitigation measures are not required.

2.7.18 Hazardous & Solid Waste

Additional mitigation measures are not required.

2.7.19 Transportation

1. The Proponents are to coordinate with NDOT and utilize proper signage and Intelligent Traffic System devices to avoid potential impacts to visibility and roadway conditions due to operation of the EEC plant.

2.8 Preferred Alternative

BLM's Preferred Alternative essentially follows the Proposed Action, including the following components:

- 3,000 acre South Plant Site including the 500-kV switchyard.
- Lages Station well field (8,000 AFY), pumping 8,000 gpm for six months and 2,000 gpm for the remaining six months together with an expanded raw water pond at the plant site to store water for peak usage during summer months.
- Water pipeline from Lages Station to the South Plant Site.
- 500/345-kV Robinson Summit Substation.
- 345-kV transmission line loop-in of the Falcon – Gonder Line at Robinson Summit Substation.
- Two 500-kV transmission lines from the plant site to the SWIP Corridor then south to the Robinson Summit Substation.
- Two 500-kV transmission lines (RS-HA Lines #1 and #2) from Robinson Summit Substation in the SWIP Corridor south to Harry Allen Substation (only one constructed initially with Phase 1).
- RS-HA Line #1 would deviate from the SWIP Corridor within two areas along Segment 6C, and also along Segment 9A to mainly avoid topographic and difficult construction constraints. RS-HA Line #2 would be routed within the existing SWIP Corridor.
- Expansion of the existing Harry Allen Substation.
- Rail lead from the South Plant Site to the Nevada Northern Railway.

The BLM's Preferred Alternative also includes all mitigative measures (**Section 2.7**) and BMPs (**Appendix 2A**).

Chapter 3
Affected Environment

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Chapter 3
Affected Environment

3.1 Introduction

This chapter describes the existing conditions of the physical, biological, cultural, and socioeconomic resources that have the potential to be affected by activities related to the Proposed Action and Action Alternatives discussed in Chapter 2. These resources include those that occur within, are adjacent to or associated with the project area, as well as those identified during the scoping process (**Section 1.13**) and BLM Interdisciplinary Team review. More detailed information on existing water resources conditions is documented in the baseline technical reports used for the water resources analysis (Mayo 2007a, EMS-I 2008). These reports are included on the distribution CD for this EIS.

3.2 Water Resources

This section describes surface water and groundwater resources that may be affected by project activities in Steptoe Valley. Water-related resources evaluated in this section include surface water features such as perennial and intermittent streams, springs, lakes, wetland areas, floodplains, and groundwater resources such as aquifers and water rights.

Steptoe Valley is located within the Central Hydrographic Region and the Steptoe Valley Hydrographic Area as described by the USGS and the NDWR, Department of Conservation and Natural Resources. A total of 14 hydrographic regions and 232 hydrographic areas have been established for Nevada (NDWR 2006).

The elongate-shaped Steptoe Valley located in central eastern Nevada ranges from 4 to 10 miles wide, east-to-west, and approximately 90 miles long, north-to-south. The valley drains northward with an average gradient of 11 feet per mile. The southern end of the valley floor has an elevation of approximately 7,000 feet above mean sea level (amsl), while the northern end of the valley, near Currie, has an elevation of about 6,000 feet amsl. Butte and Spring Valleys, which have similar topography, lie west and east of Steptoe Valley respectively. Goshute Valley lies to the north, while Jakes Valley lies southwest and the White River Valley lies to the south.

3.2.1 Area of Analysis

Two areas of analysis occur for water resources: the area of potentially affected surface water resources and the area of potentially affected groundwater resources. The majority of the potentially affected water resource area is located in Steptoe Valley north of Ely, White Pine County, Nevada. Outside of Steptoe Valley, an Alternative Rail Line extends south from an area near Shafter, Elko County, Nevada through Goshute Valley to the main Steptoe Valley area; and electric transmission lines extend from Steptoe Valley across the Egan Range through Butte Valley, and then continue south from Robinson Summit to the existing Harry Allen Substation in Clark County, Nevada.

The area of analysis for potentially affected surface water resources extends from Shafter south to the existing Harry Allen Substation. In addition to the area of direct effects due to surface disturbances, resources potentially affected by project water supply requirements were determined by evaluating modeled groundwater drawdown zones for six water supply alternatives. The seventh water supply alternative involved the diversion of surface water rights

from the Duck Creek drainage system. All water supply alternatives are located within the northern Steptoe Valley basin. Water supply alternatives included the following:

- Lages Station Well Field – Constant or Variable Pumping Scheme (Proposed Action)
- Reduced Lages Station with Coyote Valley Ranch Well Field (Alternative)
- Reduced Lages Station with Limited South Well Field (Alternative)
- North Well Field (Alternative)
- Middle Well Field (Alternative)
- South Well Field (Alternative)
- Duck Creek Impoundment (Alternative)

Water supply alternatives are described in detail in **Section 2.2.3**. Drawdown models for the Proposed Action and Water Supply Alternatives were based on existing groundwater data and pumping rates of active water rights within Steptoe Valley, and drawdown zones were created for each of the Alternatives based on the required project pumping scheme. The area of analysis for direct and indirect impacts related to groundwater pumping was defined as the resource area potentially affected by the groundwater drawdown zone. Drawdown zones for the 1-, 5-, 10-, 25-, and 50-year periods were generated for each alternative. Model parameters and depictions of each drawdown scenario can be found in EMS-I (2008). The area of analysis for groundwater impacts, and potential indirect impacts to surface water features over the groundwater impacts, was found to be contained in Steptoe Valley from roughly Duck Creek on the south to the north end of the valley.

For the Duck Creek Impoundment water supply alternative, the area of analysis was defined as the Duck Creek drainage within Duck Creek and Steptoe Valleys. This water supply alternative involves diverting water from those impoundments to the selected plant site. The Duck Creek drainage system is described in detail in **Section 3.2.3.2**.

3.2.2 Data Sources and Methodology

As previously discussed in **Section 1.13.2**, a number of issues associated with potential environmental impacts were identified, along with corresponding indicators to help address those issues. The issues involved potential environmental effects regarding water quality, water quantity, and drawdown effects on surrounding environmental resources, in addition to wastewater discharge. Project-related activities causing potential water resource effects can be grouped into two categories: permanent and temporary surface disturbance, which occurs throughout the project area; and water supply usage, which is limited to Steptoe Valley. In order to evaluate potential project impacts, existing surface water and groundwater conditions were evaluated for the areas of analysis described in **Section 3.2.1** through a combination of literature research, field data collection, and modeling.

3.2.3 Existing Conditions

Baseline water resources data collection included surface water chemistry and flow rates in selected streams and springs in the Steptoe Valley basin; groundwater chemistry from selected shallow- and deep-aquifer wells throughout Steptoe Valley; and wetland surveys. Existing data were reviewed for streams and floodplain/special flood hazard areas, as well as precipitation. Data was collected in fall 2006 and spring and early summer 2007. Groundwater and spring baseline data can be found in the hydrology baseline report by Mayo and Associates (Mayo 2007a) in the project record.

3.2.3.1 Precipitation

Local precipitation in the area is directly influenced by regional topography and, therefore, varies throughout Steptoe Valley. Precipitation falls in the form of rain and snow in both the valley and bounding ranges. According to the Western Regional Climate Center, average precipitation in the Ely area is 9.69 inches annually, while McGill averages 8.91 inches annually. Higher elevations in the Schell Creek and Egan Ranges may experience averages over 20 inches per year, and Eakin et al. (1967) reported that precipitation may exceed 30 inches per year locally.

Recorded precipitation in Ely during 2005 was above average (12.99 inches), just below average in 2006 (9.20 inches), and well below average in 2007 (6.76 inches). May tends to be the wettest month, averaging 1.09 inches of total precipitation, while July tends to be the driest, averaging 0.59 inches. Snowfall in the Ely area averages 8.8 and 8.9 total inches in January and February, respectively, and measurable averages occur as late as June and as early as September. Average water year snowfall in Ely is 50.82 inches, while the 2005 water year (October 2004-September 2005) was above average at 64.90 inches. Ely snowfall data for the 2006 water year is incomplete; however, average water year snowfall in McGill is 21.62 inches, and both the 2005 (47.50 inches) and 2006 (35.10 inches) water years were well above average. Additional detail regarding precipitation and snowpack in Steptoe Valley over the previous decade is presented in JBR (2008b).

3.2.3.2 Surface Water

Surface water features, including streams, lakes, springs, and wetlands, are shown in **Figure 3.2-1**. Streams and lakes are discussed here, while wetlands and floodplains are discussed in additional detail in **Sections 3.2.3.3** and **3.2.3.4**, respectively. Springs are discussed in detail within the groundwater discussion in **Section 3.2.3.5**. Historic and recent measured flows for Duck Creek, as well as recent measured flows for other streams in the Steptoe Valley basin, are shown in **Tables 3.2-1**, **3.2-2**, and **3.2-3**, respectively. Baseline water quality data and flow rates for monitored springs located in Steptoe Valley and Butte Valley basins are shown in Mayo (2007a).

Streams

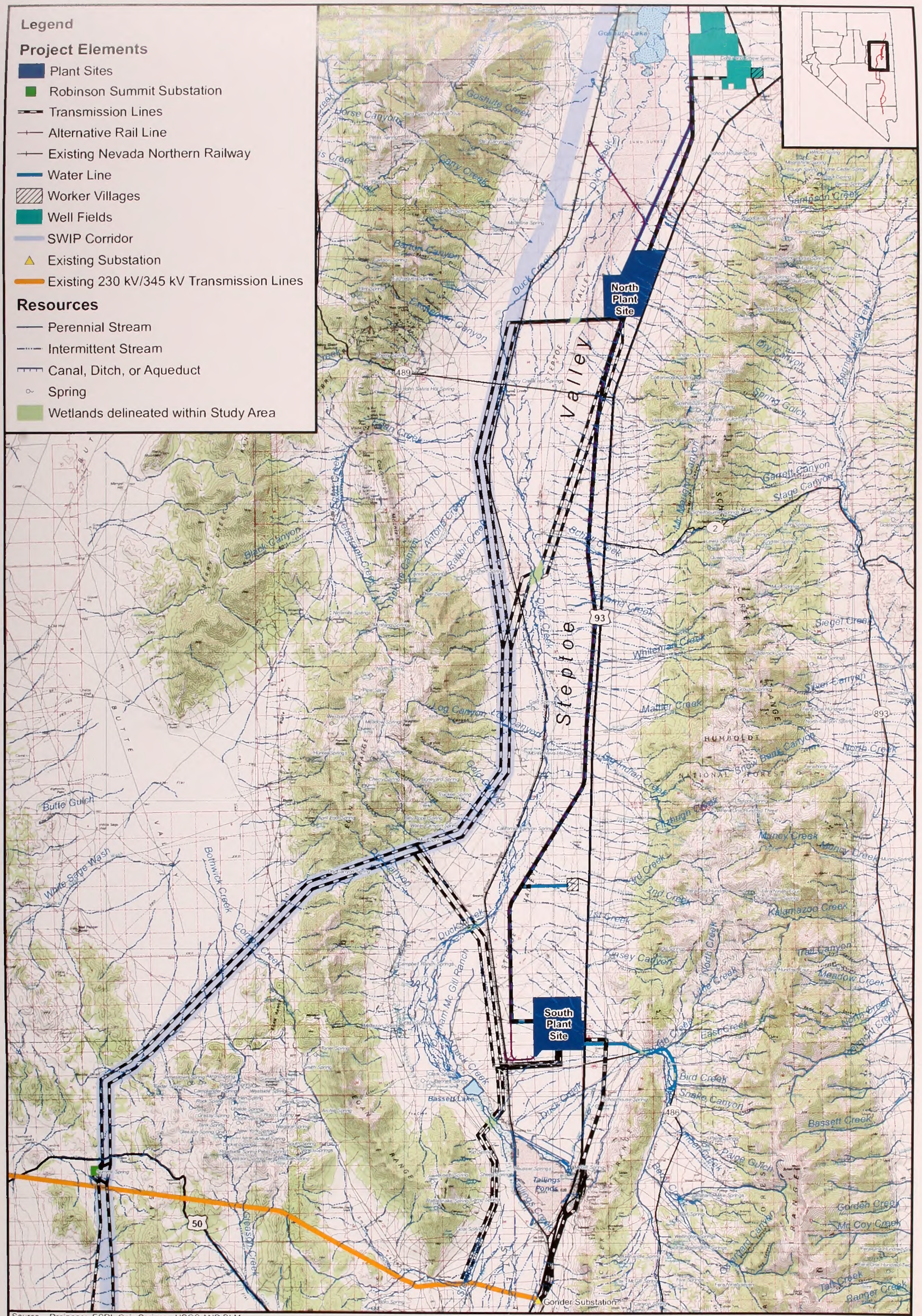
Stream systems within the area of analysis range from large, perennial features (i.e., Duck Creek in Steptoe Valley) to both large and small ephemeral streams and washes spread throughout the project area from Shafter south to the Harry Allen Substation expansion. Within the main project area of Steptoe Valley, the principal stream systems issue from the Egan Range and Cherry Creek Mountains to the west and from the Schell Creek Range to the east. These ranges rise steeply, as much as 3,500 feet above the valley floor. Alluvial fan surfaces, generally 1 to 2 miles wide, flank the mountain fronts and blend into the relatively flat valley floor. Of the stream systems, only two flow perennially onto the valley floor—Duck Creek and Steptoe Creek. The perennial reach of Steptoe Creek, issuing from the western flank of the Schell Creek Range, is primarily located south of Ely and south of the area of analysis. According to Clark and Riddell (1920), Steptoe Creek loses an average of 0.27 cfs per mile across the valley floor, with flow typically terminating in the vicinity of the Ely airport. However, during wet years, it has been known to flow as far north as the Bassett Lake area and enter into the Duck Creek system (Frick 1985). Because the perennial reach of Steptoe Creek is outside the area of analysis, and water supply alternatives are not likely to affect Steptoe Creek in any manner, it is not discussed in detail here.

Duck Creek

The principal stream in the main project area of northern Steptoe Valley is Duck Creek. Duck Creek originates from the Duck Creek Valley, east of the Duck Creek Range, flowing generally north, then west through Gallagher Gap and into Steptoe Valley, then north through Bassett Lake and continuing towards Goshute Lake (**Figure 3.2-1**). Within Duck Creek Valley, water from perennial springs and stream tributaries to Duck Creek is diverted into impoundments owned and operated by Kennecott Copper Company (KCC). The Duck Creek impoundments were built in the early 1900s to provide a reliable water supply to the copper concentrator and smelter at McGill until these facilities closed in 1982. Water from these impoundments is passed through a 37-inch steel pipeline running north and then west through Gallagher Gap. The pipeline then runs south along the mountain front to the McGill KCC property where it is now employed to irrigate the reclamation vegetation on the KCC tailings area during the summer months. The water added to the tailings pond during the growing season is largely consumed in irrigation. During the winter, flow from the pipeline is routed through the KCC property for discharge into Duck Creek. Frick (1985) reported fairly consistent flows on the order of 12 to 13 cfs through this pipeline, which were corroborated during baseline studies for this EIS by an analysis of gauge data provided by KCC from 1993 to 2007. Under conditions of higher runoff (spring snowmelt, heavy precipitation, etc.), excess flow from Duck Creek is bypassed around the impoundments via its natural channel to the immediate west. This bypass channel was dry during fall and winter 2006 and spring 2007 field inspections; however, during early July 2007, a measured rate of 10.69 cfs was observed (**Table 3.2-2**).

In addition to Duck Creek, North Creek and East Creek provide relatively small gaining flows (about 2.5 cfs) to the stream channel exiting Gallagher Gap. Once in Steptoe Valley, the main Duck Creek channel divides into a number of smaller branches and eventually loses all flow to infiltration across the broad alluvial fan. During high runoff periods, flow through some of these channels continues across the fan and enters the Duck Creek system near Bassett Lake; however, this condition was not observed during baseline evaluations.

In the vicinity northwest of McGill, Duck Creek reestablishes through a combination of higher-volume (greater than 10 cfs) spring flows from McGill Spring, surface water discharge from the KCC pipeline (or runoff from the tailings ponds during the summer months into Tailings Creek). Steptoe Slough, located upstream of Bassett Lake, is fed by Heusser Spring at its headwaters, although the exact location of the Heusser discharge proved difficult to identify. A large area of seepage occurs from the approximate location of Heusser Spring northward for approximately 1.5 miles until a defined channel occurs, meeting up with the streams from McGill Spring and Tailings Creek, approximately 0.5 miles further to form Duck Creek upstream of Bassett Lake. Heusser Spring and the associated seepage areas are located at the foot of the alluvial fan extending east from the western-bounding Egan Range. Duck Creek flows out of Bassett Lake through a concrete weir/culvert structure located at the eastern end of the impoundment dam. Water levels in Bassett Lake are controlled at this location through the placement/removal of a series of batten boards. Bassett Lake appears to be a groundwater recharge system, as more surface water appears to enter the lake than leaves the lake through the culvert. Marsh areas that occur on the north side of the dam appear to be supported by water leaking under the dam, and the extent of these areas appears to vary in regards to season and annual precipitation and



Source - Drainage: ESRI, Gnis Springs: USGS AND BLM
Base Map: USGS 1:100,000-scale topographic maps, (Currie, Ely, Kern Mountains, Mount Hamilton, Newark Lake, and Ruby Lake, Nevada)

1:240,000
5 0 5 Miles
5,000 0 5,000 Meters
Scale is 1:500,000 when printed at 11"x17"

FIGURE 3.2-1
WATER RESOURCES IN STEPTOE VALLEY
ELY ENERGY CENTER

runoff levels (JBR 2008b). Upon leaving Bassett Lake, Duck Creek appears to flow across a number of solid, dense, resistant beds material, and water in the stream appear to be lost lateral to the stream channel in this reach (JBR 2008b).

Downstream of Bassett Lake, a number of springs and wet meadow areas within a region upslope to the west of the Duck Creek channel, known as the Campbell Embayment, provide gaining flows to the Duck Creek system. According to USGS maps, Duck Creek flows perennially northward through a distinct channel to approximately 2.2 miles north of White Pine County Road 18 (CR-18), also known as the Pony Express Road. A number of springs in this reach provide additional gaining flows, including the thermal Monte Neva Hot Spring. Duck Creek has a broad floodplain through this region that is typically inundated during the high-flow spring runoff period. North of CR-18, Duck Creek broadens into a number of braided channels, rapidly losing flow to infiltration and evapotranspiration (ET) in a distinctly flat section of the valley floor. From this point northward, Duck Creek is considered ephemeral. A number of springs are present on the west side of the valley in this northern vicinity, however flow from these springs is consumed by ET and infiltration before entering the main channel of Duck Creek and their rates are not substantial enough to reestablish Duck Creek as perennial surface water.

Limited historic flow data is available for Duck Creek. Savard and Crompton (1993) provided mean, maximum, and minimum flows from a gauging station located approximately 8 miles southeast of Cherry Creek for the water years 1986 and 1987 (**Table 3.2-1**). It should be noted that while the annual average flow is approximately 45 cfs, this takes into account spring runoff flow values in excess of 115 cfs and summer base flow values of less than 1 cfs when measured at identical locations.

TABLE 3.2-1. HISTORIC FLOWS FROM THE DUCK CREEK SYSTEM

WATER YEAR (OCTOBER-SEPTEMBER)	FLOW RATE (CFS)		
	MEAN	MAXIMUM	MINIMUM
1986	45.1	130	0.7
1987	44.9	115	1.6

Source: Savard and Crompton (1993)

In addition to the limited historic data, baseline flow measurements for the Duck Creek system were conducted as part of baseline investigations for this EIS and are shown in **Table 3.2-2**.

Monitoring stations were established at 13 fixed locations throughout the system, and seasonal measurements were recorded in order to establish a flow balance for various segments of Duck Creek. Flow rates appeared to be consistent with observations provided in Frick (1985) and Savard and Crompton (1993) with significant seasonal variation; however, maximum measured flow rate did not exceed 65 cfs whereas Savard and Crompton reported rates up to 130 cfs. It should be noted that for both the 2007 calendar and water years, precipitation values (during which field baseline measurements were collected) were approximately 28 percent below normal, although during 2005 and 2006 precipitation values were well above normal (**Section 3.2.3.1**). In addition to diversion by KCC at Duck Creek's headwaters, other gaining flows from the Campbell Embayment are also diverted from May through September for agricultural purposes. Field observations generally concurred with the perennial flow distance shown by USGS mapping.

TABLE 3.2-2. MEASURED BASELINE FLOWS FROM THE DUCK CREEK SYSTEM

LOCATION	FLOW RATE (CFS)			
	FALL 2006[1]	SPRING 2007[2]	SPRING 2007[3]	SUMMER 2007[4]
Weir Above KCC Reservoirs	42	8.020	10.490	9.020
Reservoir Bypass Channel	--	-Dry-	-Dry-	10.690
Outflow at Reservoir	--	0.420	1.430	3.440
Canal Outflow	46	1.960	1.650	0.900
Middle Duck Creek (near US-93)	45	3.890	3.020	7.290
KCC Pipe Outflow (near McGill)	--	6.780	9.660	6.630
Tailings Creek	--	4.690	--	4.310
Below Pumphouse	--	25.430	29.100	14.220
Below Bassett Lake	43	31.110	49.060	18.680
At Railroad Culvert	44	28.990	62.460	13.990
Monte Neva Rd.	--	--	46.680*	49.870**
Pony Express Rd.	-Dry-	-Dry-	64.080	16.540
Cherry Creek Highway	-Dry-	-Dry-	59.020***	2.390****

-- Indicates no measurement collected
[1] Late October/Early November 2006
[2] Late March/Early April 2007
[3] Early May 2007
[4] July 2007

* Coarse rate estimate at multiple submerged culverts. Flow is likely higher than estimated
** Rate estimated from flow at multiple culverts.
*** Rate estimated from a measurement at one channel and 3 separate culverts (36" ea.).
****Rate estimated from a measurement at one channel and 2 separate culverts (12" & 24")

Within the perennial reach of Duck Creek, the following Project elements either cross or have potential involvement with the system:

- Mt. Wheeler Power Line
- Duck Creek Impoundment Water Supply Pipeline Alternative
- Transmission Line Segment 1A
- Transmission Line Segment 3
- Transmission Line Segment 4A
- Reduced Lages Station with Coyote Valley Ranch Well Field Water Supply
- Reduced Lages Station with Limited South Well Field Water Supply
- Middle Well Field Water Supply
- South Well Field Water Supply

Additionally, Segment 1B crosses an ephemeral reach of Duck Creek west of the North Plant Site; and the Lages Station Well Field, the Reduced Lages Station with Coyote Valley Ranch Well Field, the Reduced Lages Station with Limited South Well Field, and the North Well Field water supply Alternatives all have drawdown zones in, or adjacent to, the ephemeral reach.

Other Stream Systems

In addition to the two main systems of Steptoe Creek and Duck Creek, a number of smaller stream systems issue from the bounding ranges of Steptoe Valley. Flow from these streams only reaches the valley floor during high runoff periods, such as during snowmelt or heavy precipitation events. The majority of these smaller streams are perennially fed in their upper reaches by bedrock spring discharge in the mountains; however, spring discharge alone is not sufficient to sustain flow in these streams for any appreciable distance into Steptoe Valley.

Additionally, a number of these have their flow diverted for agricultural purposes at their respective canyon exit points onto the alluvial fan.

As part of the baseline monitoring for this investigation, flows for a number of these smaller streams discharging to Steptoe Valley were measured. Rates are shown in **Table 3.2-3**. In addition to these stream systems, flow rates for a number of higher-elevation springs within the Steptoe Valley basin were also measured and are shown in Table 2 of the Mayo report (2007a).

Outside of the Steptoe Valley basin, only reaches of the White River flow perennially through the area of analysis for surface water impacts. Segment 6C crosses the White River twice in White Pine County—once near its headwaters, and then again to the south of the Kirch Wildlife Management Area. White River is discussed in additional detail in **Section 3.2.3.3** below.

According to the BLM Nevada State Office of Mapping Sciences, there are no perennial streams within the area of analysis in Elko, Nye, or Clark Counties. Several large, named ephemeral streams and washes are crossed by linear project elements, including Jakes Wash in White Pine County (Segment 6C); Big Spring Wash in Nye County (Segment 6C); and Bailey, Silverhorn, Fairview, Porphyry, Red Rock, Cottonwood, Monkeywrench, Helen, Cedar, Kane Springs, and Pahranagat washes in Lincoln County (Segments 8, 9D, 10, and 11). Additionally, a number of smaller, unnamed washes are present throughout the project area as shown in **Figure 3.2-1**. These ephemeral washes serve to control rates of sediment deposition and dissipate the energy associated with flood flows, as well as provide habitat for breeding, shelter, foraging, and movement of wildlife. Some plant populations are specifically adapted to the conditions associated with these ephemeral aquatic ecosystems.

TABLE 3.2-3. MEASURED FLOWS FROM SELECTED STREAMS – STEPTOE VALLEY BASIN

LOCATION	FLOW RATE (CFS)			
	FALL 2006[1]	SPRING 2006[2]	SPRING 2007[3]	SUMMER 2007[4]
Steptoe Valley Basin				
Upper Telegraph Creek	0.320	--	--	--
Lower Telegraph Creek	0.480	--	--	--
Egan Creek (below springs)	1.420	--	--	--
Egan Creek (Lower)	2.760	2.880	2.450	2.711
McDermid Creek	--	1.510	1.270	-Dry-
Goshute Creek	--	2.830	1.400	1.257
Steptoe Creek (@ US-93)	--	1.240	-Dry-	-Dry-
Big Indian Creek	--	1.040	0.760	0.190
North Creek (at rd.)	--	1.250	2.560	1.016
East Creek (above rd.)	--	0.850	0.700	0.904
North Creek (above rd.)	0.550	0.760	1.960	0.262
Tehama Creek	--	--	--	0.190

-- Indicates no measurement collected
[1] Late October/Early November 2006
[2] Late March/Early April 2007
[3] Early May 2007
[4] July 2007

Lakes

Within the Steptoe Valley basin, there are three primary lake features: Comins Lake, Bassett Lake, and Goshute Lake. Comins Lake is located outside the area of analysis and is, therefore, not described here.

Bassett Lake, a man-made impoundment managed for fisheries, is located on the west side of Steptoe Valley, west-southwest of the proposed South Plant Site. It is fed from a combination of sources, including surface water flow from Duck Creek, Tailings Creek, McGill Spring, and Heusser Spring (and associated seepage areas). During the early spring, late fall, and winter months, water from the KCC impoundments in Duck Creek Valley is discharged immediately upstream of Bassett Lake via a pipeline outlet. One hundred percent of the Duck Creek flow volume reaches the lake. During the summer months, water diverted from the Duck Creek system by KCC is used to irrigate the tailings area west of McGill. Per KCC records, approximately 4,750 acre-feet of water from the Duck Creek system is diverted for irrigation, a portion of which runs off into the Bassett Lake drainage via Tailings Creek, which is located on the western margin of the tailings area.

Goshute Lake, a playa, or dry lakebed, is located near the northern end of Steptoe Valley. It is the geographic terminal sink for the Duck Creek drainage system; however, flow from Duck Creek typically fails to reach the lake due to infiltration. A review of periodic historic aerial photography dating to the 1960's shows that surface water from Duck Creek rarely reaches the lake, even during spring runoff periods. A number of local springs and ephemeral creeks also discharge to Goshute Lake although their flows are rapidly lost to infiltration and ET. During a field inspection in June 2007, the southern, western, and northern margins of the lake were observed to be fields of saltgrass (*Distichlis spicata*) with alkali substrate sufficiently dry to traverse by vehicle. A small but marked topographic break (4 to 5 feet high) denotes the edges of Goshute Lake, which is surrounded primarily by Wyoming sagebrush (*Artemisia tridentata var. wyomingensis*) and rubber rabbitbrush (*Chrysothamnus nauseosus*).

Surface Water Quality

Nevada's 2004 303(d) list of impaired waters, which was approved by EPA as a final list in November 2005, shows there are no Clean Water Act (CWA) Section 303(d) impaired waters in the project area, nor are there waters for which Total Maximum Daily Loads (TMDL) have been established.

The Nevada Division of Environmental Protection (NDEP) lists Duck Creek as fully supporting of its uses for the 13.16 miles of its length considered to be perennial (NDEP 2005b, p.37). Steptoe Creek is one of three Nevada streams incorporated in the USGS Bench-Mark Network, which is "a monitoring network on small drainages whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected (by) the activities of humans" (NDEP 2007). As a closed basin, comprised primarily of ephemeral streams, little water quality sampling has been performed in the Duck Creek drainage. **Table 3.2-4** shows surface water chemistry at selected locations in the Steptoe Valley watershed from 2006 and 2007 (Mayo 2007a) Data displayed included stream flow (Q), conductivity (CND), pH, total dissolved solids (TDS), calcium (CA), magnesium (MG), sodium (NA), potassium (K), bicarbonate (HCO_3), chloride (CL), sulfate (SO4), and fluoride (F). **Table 3.2-5** and **3.2-6** show chemistry for springs and groundwater, respectively.

TABLE 3.2-4. SURFACE WATER CHEMISTRY

LOCATION	Q	CND	PH	TDS	CA	MG	NA	K	HCO_3	CL	SO4	F
	CFS	µS		MG/L								
PALEOZOIC ROCK CREEKS – EGAN RANGE												
Lower Telegraph Ck	0.48	350	8.6	180	45	10.0	10.0	1.9	256	7.6	19.0	0.16
Upper Telegraph Ck	0.32	370	8.7	180	54	9.5	7.3	1.6	195	4.5	13.0	0.13
Egan Creek below springs	1.42	470	8.1	210	47	21.0	11.0	2.2	195	9.0	20.0	0.18
Lower Egan Creek	2.76	430	8.5	180	47	9.1	6.8	1.9	256	4.3	12.0	0.13
Egan Creek	N/A	N/A	N/A	N/A	47	17.7	22.8	1.1	233	10.5	17.4	0.09
Goshute Creek	2.83	N/A	N/A	N/A	56	22.4	5.0	0.2	269	3.1	15.5	0.06
VOLCANIC ROCK CREEKS--SCHELL RANGE												
Big Indian Creek	1.04	N/A	N/A	N/A	57	14.9	13.4	0.0	240	7.7	29.2	0.09
STEPTOE CREEK – ALLUVIAL—SCHELL RANGE												
Steptoe Creek 3	N/A	N/A	N/A	N/A	64	53.1	52.0	12.3	531	18.7	68.7	0.19
STEPTOE VALLEY FLOOR - DUCK CREEK												
Duck Creek at Gauge	8.02	260	8.5	100	37	11.0	3.2	1.6	158	1.8	6.4	0.00
Duck Creek below Bassett Lake	31.1	1000	8.4	610	110	53.0	19.0	8.4	293	14.0	240	0.47
Duck Creek near Steptoe Ranch	29.0	1070	8.4	680	110	60.0	26.0	9.7	366	15.0	240	0.59
Middle Duck Creek	3.89	470	8.7	210	60	17.0	7.3	3.3	280	3.4	13.0	0.17
Duck Creek	N/A	N/A	N/A	N/A	54	13.4	8.0	1.9	240	4.6	12.1	0.07

Source: Mayo 2007a, Note: some numbers have been rounded from Mayo.

The USGS has no surface water monitoring stations in the direct impact portion of the Steptoe Valley Basin (Steptoe Creek is outside the direct impact area for the Action Alternatives), and the nearest waterbody on the State 303(d) impaired list is Comins Lake, which is approximately 10 miles southeast of Ely. Comins Lake is listed as impaired for pH (NDEP 2005b). The Nevada State Health Division and the Nevada Department of Wildlife have issued a health advisory recommending against consumption of northern pike and largemouth bass from Comins Lake due to their average mercury content over one part per million (ppm) (1.20 and 1.25, respectively) (NDOW 2007a); average mercury content for rainbow trout in Comins Lake is 0.85 ppm. By comparison, average mercury content for northern pike and largemouth bass in Bassett Lake is 0.03 ppm and 0.02 ppm, respectively (NDOW 2007b). Water quality samples for both water bodies showed mercury below the detection level, which varied between 0.1 mg/L and 0.5 mg/L (NDEP 2007a), indicating that the excessive mercury concentrations in fish tissue is likely due to bioaccumulation.

Outside the Steptoe Valley Basin, there are no 303(d) listed waterbodies in the direct impacts area to the north along or near the rail or water line alignments. To the south, the transmission line encounters no 303(d) listed waterbodies in White Pine, Nye, or Lincoln counties, but in Clark County, the transmission line runs within a mile of a 303(d)-listed impaired reach of the Muddy River (NDEP 2005a). Pollutants or stressors of concern for the reach of the Muddy River upstream from Glendale are listed as total iron, temperature, and total phosphorous (NDEP 2005a). No source for these impairments has been designated by NDEP, which has contested the phosphorous standard applied by EPA, due to naturally occurring phosphorous in the local geology, such as carbonate rocks (NDEP 1998a).

3.2.3.3 Wetlands and Waters of the U.S.

The area of the two plant site locations (including the associated worker villages), as well as the water supply facilities, rail facilities, and transmission line alignments, were evaluated for the presence of wetlands and waters of the U.S. by JBR (2007a).

Regulatory Framework

Waters of the U.S. are defined as all waters which are used in interstate or foreign commerce, including wetlands, as well as intrastate lakes, rivers, streams, wetlands, etc. whose degradation or destruction could affect interstate or foreign commerce (33 CFR 328.3). Wetlands, as defined in 40 CFR 230.3 and 33 CFR 328.3, may be jurisdictional if they are adjacent to waters of the U.S. The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the U.S by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands." In the absence of adjacent wetlands, the limits of federal jurisdiction extend to the ordinary high water mark (OHWM) (Corps 2005). The United States Army Corps of Engineers (Corps) are tasked with regulating waters of the U.S., including wetlands.

Waters of the U.S.

The presence and extent of waters of the U.S. within the survey area was determined by assessing channels in the area for the presence of a defined bed and bank channel, and, particularly, the presence of an OHWM. The presence of an OHWM provides an indication that a channel conveys water on a regular basis. Regulatory Guidance Letter (RGL) 05-05 provides additional guidance to Corps districts in making OHWM determinations. The RGL provided a list of recommended physical characters that could be used to the extent they can be identified and are deemed reasonably reliable. In determining the appropriate field characters to use, the list of OHWM characters in 33 CFR 328.3(e) and in RGL 05-05 was reviewed, and it was determined that the list of indicators from both sources was reasonably reliable and appropriate for this survey:

- Clear, natural line impressed on the bank
- Shelving
- Changes in the character of soil
- Destruction of terrestrial vegetation
- The presence of litter and debris
- Wracking (debris lines)
- Vegetation matted down, bent, or absent
- Sediment sorting
- Leaf litter disturbed or washed away
- Scour
- Deposition
- Multiple observed flow events
- Bed and banks
- Water staining
- Change in plant community

Wetlands

The location and extent of wetlands in the survey area was determined following the procedures outlined in the Corps' Technical Report Y-87-1, Corps of Engineers Wetland Delineation Manual (Corps 1987), referred to as "the Manual." Representative locations in potential wetland vegetation types present in the survey area were examined for wetland characteristics in accordance with the criteria contained in the Manual. Sample sites were established in each hydrophytic plant community in the area. Sites in adjacent vegetation communities or at boundaries of community types were also examined. At each site, the vegetation, soils, and hydrology were examined for wetland characteristics.

Hydric Soils

Hydric soils are defined as "... soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation. Hydric soils usually include all histosols except Folists; soils in Aquic suborders, Aquic subgroups, albolls suborder, Salorthids great group, or Pell great groups of Vertisols that are: somewhat poorly drained, poorly drained, or very poorly drained; soils that are ponded for long or very long duration during the growing season; or soils that are frequently flooded for long duration or very long duration during the growing season" (Corps 1987).

Hydric soil indicators are found in the major portions of the herbaceous plant rooting zone, generally between 6 and 12 inches from the soil surface. Common hydric soils indicators include low chroma soils above or including a depleted matrix, gleying, organic matter streaking, reddish staining or streaks (redox features), hydrogen sulfide odor, and/or a muck or peat layer (histic epipedon). *Field Indicators of Hydric Soils in the United States, Guide for Identifying and Delineating Hydric Soils, Version 6.0* (NRCS 2006) was used as a guide to identify and delineate hydric soils in the field.

Wetland Vegetation

Wetland (hydrophytic) vegetation is defined as any macrophyte that grows in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water. The Manual requires that, in most cases, more than 50 percent of the dominant vegetation consists of plants that meet the wetland plant technical criteria.

Vegetation was visually surveyed in the vicinity of soil test pits to estimate the percent aerial cover of dominant species present in each stratum, or vegetative layer, and to characterize the plant communities as required in the Manual. Plants not identifiable in the field were identified using *Intermountain Flora*, (Cronquist et al. 1972 and later [multiple volumes]), and *The Jepson Manual, Higher Plants of California* (Hickman 1993).

The wetland indicator status for each species was recorded to aid in making jurisdictional wetland determinations. According to the *National List of Plant Species that Occur in Wetlands: Intermountain (Region 8) - Biological Report 88 (26.0)*, (Reed 1988), the indicator categories are defined as:

- Obligate Wetland (OBL). Occur almost always (estimated probability >99 percent) under natural conditions in wetlands.
- Facultative Wetland (FACW). Usually occur in wetlands (estimated probability 67 percent-99 percent), but occasionally found in non-wetlands.
- Facultative (FAC). Equally likely to occur in wetlands or non-wetlands (estimated probability 34-66 percent).

- Facultative Upland (FACU). Usually occur in non-wetlands (estimated probability 67-99 percent), but occasionally found in wetlands (estimated probability 1-33 percent).
- Obligate Upland (UPL). Occur almost always (estimated probability >99 percent) under natural conditions in non-wetlands in the region specified.
- No Indicator (NI). Insufficient information available to determine an indicator status. If required, status was determined by the investigator using the above mentioned references (Cronquist et al. 1972; Hickman 1993).

To further refine these categories, a "+" or "-" may be used to indicate whether a species of plant is more or less likely, respectively, to occur in a wetland site. An asterisk (*) indicates a tentative assignment to an indicator status based on preliminary information.

Wetland Hydrology

Wetland hydrology is the driving force behind wetland formation. The term "wetland hydrology" encompasses all hydrologic characteristics of areas that are periodically inundated or have soil saturated to within 12 inches of the soil surface at some time during the growing season (Corps 1987; 2007). During the survey, several indicators were used to determine wetland hydrology. Some of these indicators were: visual observation of saturated soils, visual observation of flooding or ponding, soil permeability and texture, evidence of anaerobic conditions within the upper root zone, root staining, and the amount and type of plant cover. Other indicators of wetland hydrology are: drainage patterns (i.e., situation in topographical depressions or channels), drift lines, sediment deposits, water marks, oxidized root zones, location in annual floodplain, water-stained leaves, surface scoured areas, morphological plant adaptations, and algae growth or remnants.

Findings

Prior to the field investigation, the *Soil Survey of White Pine County, Nevada, West Part* (NRCS 1988) was reviewed for the Steptoe Valley portion of the project area, as was the National Wetlands Inventory (NWI) mapping compiled for the entire project area. Areas of interest identified in the pre-field review were then visited in October and November 2006, and in June 2007, and were surveyed for potential wetlands and Waters of the U.S.

Waters of the U.S.

Steptoe Valley

The principal drainage in the project area is Duck Creek. The Duck Creek drainage originates in the Schell Creek Range and runs west into Steptoe Valley, then north toward Goshute Lake, an ephemeral water body located at the northern end of Steptoe Valley. Steptoe Valley is a closed basin, though diversions from Duck Creek support agriculture and other commercial activities. These diversions may be considered a tie to interstate commerce, and, as such, may bring the Duck Creek channel and adjacent wetlands, as well as tributary channels that share a defined channel connection with Duck Creek, into jurisdiction under the CWA.

The southern reaches of Duck Creek include a defined channel (i.e., a channel with defined bed and bank and the presence of an OHWM). A defined channel is present on Duck Creek to a point south of Cherry Creek Road. North of Cherry Creek Road, channel definition in Duck Creek becomes much less evident.

A number of channels drain toward Duck Creek from the surrounding mountains. The majority of these channels lose definition before reaching Duck Creek, and, as such, may be identified as isolated and not subject to regulation under the CWA. While there is a channel running

between the Gallagher Gap area on Duck Creek and Bassett Lake that is defined over its entire length and supports some adjacent wetlands (described below), its flow is artificial, originating at a diversion. As described in the Manual, "if hydrophytic vegetation is being maintained only because of man-induced wetland hydrology that would no longer exist if the activity (e.g., irrigation) were to be terminated, the area should not be considered a [jurisdictional] wetland." A Corps memorandum addressing wetlands induced by irrigation, "*Regulatory Jurisdiction in Irrigated Areas*" (Corps 1996), states that areas exhibiting wetland characteristics which are sustained solely by the application of irrigation water are not regulated under Section 404 of the CWA.

Three separate channels, including the primary Duck Creek channel, the diversion channel described above, and a third, more southerly channel, are present crossing the Mt. Wheeler Transmission Line from east to west. The flowing Duck Creek channel is approximately 10 feet wide at the crossing location, while the flowing diversion channel described above is approximately 3 feet wide at the crossing location. The third channel, which was dry, was approximately 2 feet wide at the crossing location.

The Schell Creek channel represents the largest tributary flowing toward Duck Creek from the Schell Creek Range. The creek enters Segment 1A as a defined channel, but braids and loses channel definition within the study area. No defined channel was found at the point this channel enters the valley bottom east of the Duck Creek channel.

White River

In addition to channels in the Steptoe Valley area, Segment 6C would cross the White River channel near the river's headwaters and again below the Kirch Wildlife Management Area (WMA). Because water diverted from the White River is used to support agriculture, and flows through the Kirch WMA (a site that may support interstate recreational use), the White River and its adjacent wetlands and defined channel tributaries may also be subject to jurisdiction under the CWA.

In addition to the White River itself, Segment 6C would also cross two defined tributary channels, Jakes Wash and Ellison Creek. The transmission line would cross Jakes Wash in Section 4, T14N, R61E. Jakes Wash at this location is deeply incised below ground level, and includes a 5-foot wide defined channel. The channel is bordered by big sagebrush (*Artemisia tridentata*), rubber and green rabbitbrush (*Chrysothamnus nauseosus* and *C. viscidiflorus*, respectively), greasewood (*Sarcobatus vermiculatus*), and some wild rose (*Rosa woodsii*).

To the south, Segment 6C would cross Ellison Creek in Section 22, T13N, R60E. The drainage includes a poorly defined 3-foot-wide north branch and a more deeply incised 4-foot wide south branch. The two branches join above a road located within the Segment 6C study area. To the south, the transmission line would cross a channel that conveys flows to the Ellison Creek channel from the southwest. This channel, which would be crossed in Sections 27 and 28, T13N, R60E, supports a well developed stringer of wetland vegetation, and is described under Wetlands, below.

Segment 6C would cross the upper reaches of the White River in Sections 9 and 10, T12N, R60E. The approximately 8-foot-wide flowing channel supports a limited fringe of hydrophytic vegetation, but is bordered by a 20- to 40-foot-wide riparian community that includes sandbar willow (*Salix exigua*) and skunkbush sumac (*Rhus trilobata*) above a road crossing.

Wetlands

Steptoe Valley

Wetlands are present in and adjacent to Duck Creek as it runs north through the survey area. These wetlands range from emergent wetlands supporting hard-stem and soft-stem bulrush (*Scirpus acutus* and *S. validus*, respectively) as well as some broad-leaf cattail (*Typha latifolia*), to wet meadow/alkali meadow habitats found adjacent to Duck Creek. Delineated wetland areas as discussed below are shown on **Figure 3.2-1** and can be seen in detail in the Waters of the U.S. Delineation Report (JBR 2007a).

Southwest of the South Plant Site, Segment 3 would cross the Duck Creek drainage in Sections 1 and 12, T18N, R63E, an area known as Steptoe Slough. Duck Creek wets a wide area at this location. A pond has been impounded on the western side of the channel. Vegetation in the wetted area is dominated by the FACW species Baltic rush (*Juncus balticus*) and the OBL species Nebraska sedge (*Carex nebrascensis*). Soils in the wetted area showed some root staining, and appeared to be alkali affected (soils heavily influenced by alkalinity may not always show characteristics typical of a hydric soil). A total of 95.9 acres of wetland, including the centrally-located Duck Creek channel, is present at this location. Additional field reviews in spring and summer 2008 indicate that hydrology in Steptoe Slough appears to vary both seasonally and annually, depending on precipitation and runoff amounts. This area was originally evaluated following significant precipitation years in 2005 and 2006; however, below-average precipitation and snowpack occurred in 2007 (and the first part of the 2008 water year), thereby reducing the saturated area. The total wetland area presented here likely represents the maximum wetland area that would occur in Steptoe Slough.

As noted under Waters of the U.S., above, a defined channel conveys diverted flows west from the Gallagher Gap area toward Bassett Lake. A small (1.2 acres) cattail stand was found on this channel that runs west within Segment 4A. A portion of this channel also runs within the proposed Segment 3 and Segment 4A that exit the South Plant Site on the south. The channel enters Segment 3 in Section 28, T19N, R64E, and leaves the line in Section 29, T19N, R64E. The channel conveys flows diverted from Duck Creek in Section 25, T19N, R64E. The drainage continues as a defined channel to the Bassett Lake area. Because flow in the channel is artificial (supplied by a diversion) and can be shut off, this channel and, associated wetlands, would probably not be identified by the Corps as jurisdictional features.

To the northwest of the South Plant Site, Segment 4A crosses the Duck Creek channel in portions of Sections 26 and 35, T20N, R63E. Duck Creek traverses this area in several channels. At the time of the June 2007 site visit, a low flow was present only in the eastern-most channel. Adjacent low areas supported dense stands of Baltic rush and inland saltgrass (a FAC+* species). "Islands" of higher ground supported saltgrass and the non-indicator species rubber rabbitbrush (*Chrysothamnus nauseosus*). Low-chroma, hydric soils were found in the lower areas but not on the upland islands. A total of 58.9 acres of wetland, including the Duck Creek channel, is present at this location.

Segment 1A, which would run south-southwest from the North Plant Site to join the SWIP Corridor, would cross Duck Creek in Section 13, T22N, R63E. When visited in June 2007, Duck Creek supported a moderate flow (estimated at approximately 5 cfs). The creek was fringed by a relatively narrow (20- to 30-foot wide) area of green hydrophytic vegetation, but bordered by a much wider area of alkali meadow. Vegetation in the alkali meadow was dominated by inland saltgrass, but also included such hydrophytic species as Baltic rush, and the FAC species alkali sacaton (*Sporobolus airoides*). Soils in the alkali meadow showed faint root staining, indicating

the meadow is subject to saturation in at least some years. A total of 212.2 acres of delineated wetland was present at this location.

North of Cherry Creek Highway, Segment 1B would cross an alkali meadow west of the southern end of the North Plant Site, in Section 20, T24N, R64E. The meadow supports a community that includes a mix of inland saltgrass, Baltic rush, and the NI species Basin wildrye (*Leymus* [formerly *Elymus*] *cinereus*). Evidence of root staining or other redox features were not found in the eastern part of the meadow, but were found near a fork of the Duck Creek channel, and in the meadow to the west. A denser community of hydrophytic species, including Baltic rush, was also found west of the channel. The wetland area in the meadow was identified as this denser hydrophytic community and the associated root-stained soils, which totaled 56.4 acres within Segment 1B.

Northwest of the North Plant Site, the rail lead would cross branches of the Duck Creek channel in Section 22, T25N, R64E. The Duck Creek channel in this area includes several poorly defined channels. Hydrophytic vegetation, primarily Baltic rush and silverweed cinquefoil (*Potentilla anserina*, an OBL species), occurs intermittently in the channel. Evidence of an OHWM is inconsistent, and the Corps may determine this northern section of Duck Creek does not meet the criteria of jurisdictional water.

White River

As noted above, a tributary to Ellison Creek that would be crossed by Segment 6C, and located in Sections 27 and 28, T13N, R60E, supports a long stringer of hydrophytic vegetation. The flow that supports this community issues from Warm Spring west of the segment. This flow supports a community of Baltic rush and spikerush (*Eleocharis spp.*). The channel becomes incised within the corridor, but continues to support a well-developed hydrophytic vegetation community in the amount of 2.5 acres.

A wide wetland community was also found bordering the White River channel below the Kirch WMA. The river was dry at this location at the time of the June survey, but soils were damp and included redox features. The vegetation community below a break in slope included hard-and/or soft-stem bulrush and northwest cinquefoil. The community above the break in slope included Baltic rush and inland saltgrass, with some iodine bush (*Allenrolfea occidentalis*, a FACW species) present in an alkali-encrusted area in the southeastern portion of the crossing site. A total of 74.6 acres of wetland, including the White River channel, was present within the project area at this location.

Duck Creek Valley

Within the Duck Creek water supply pipeline corridor in Duck Creek Valley, a number of wetland systems were observed. These wetlands included primarily wet meadow communities associated with agricultural land, as well as some emergent marsh areas and a man-made pond impoundment at the upper reach of the project area. Wetland hydrology in this area is primarily fed by shallow groundwater and augmented by agricultural irrigation. Riparian areas located adjacent to North Creek cross the corridor near the bend just east of Gallagher Gap. A total of 25.5 acres of wetland was delineated in this area; however, all wetlands were located outside of the existing road ROW where the water supply pipeline would be located.

Summary

A wetlands and waters of the U.S. delineation conducted for the project area identified the Duck Creek channel as a potential water of the U.S. This channel may be crossed at several locations

by proposed or alternative transmission line routes. Potential waters of the U.S. would also be crossed by the Segment 6C corridor at Jakes Wash, Ellison Creek, and the upper White River.

Wetland areas identified in the project area include Duck Creek at the Segment 4A crossing, Segment 3 crossing, Segment 1A crossing, and Segment 1B crossing, as well as a small system formed by the diversion of Duck Creek south of the South Plant Site within Segment 4A. Wetlands were also identified within Segment 6C on a tributary to Ellison Creek and on the White River below the Kirch WMA.

3.2.3.4 Floodplains

A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) shows the majority of project elements are located in Zone C, defined by FEMA as areas of minimal flooding, or Zone D, defined as an area of undetermined, but possible, flood hazard. The following project elements have potential involvement with areas mapped as Zone A, which is defined as areas of 100-year flood potential, where base flood elevations and flood hazard factors have not been identified:

- Segment 3 (Alternative) crosses an area of Steptoe Slough west of McGill in White Pine County;
- Segment 6C (Proposed Action) crosses a section of the White River south of the Kirch Wildlife Management Area in Nye County;
- Segment 11 (Proposed Action) lies west of, and crosses, a section of the Pahranagat Wash in Coyote Springs Valley in Clark County;
- Segment 11 (Proposed Action) passes through an unnamed dry lake area within Hidden Valley in Clark County;
- Segment 11 (Proposed Action) lies immediately west of Dry Lake near the Harry Allen Substation expansion site.

There are no mapped special flood hazard areas in Elko County. Special flood hazard areas exist to the west (near Hiko Wash, Ash Springs, and Alamo, NV) and the east (near Dry Canyon Wash, Cathedral Gorge Wash, and Caliente, NV) of the project area in Lincoln County; however, portions of the study area only occur within Zone D.

3.2.3.5 Groundwater

Groundwater resources were only considered for Steptoe Valley where the water supply for the Proposed Action and Action Alternatives are located. A detailed analysis of the groundwater baseline conditions is provided in Mayo (2007a) and the complete groundwater modeling is provided in EMS-I (2008) which is available on the distribution CD for this EIS.

Steptoe Valley may be divided into southern and northern segments. The southern segment, located south of Hercules Gap (i.e., approximately 6 miles north of Ely), trends slightly northwest, whereas the northern segment trends slightly northeast. Between Ely and McGill, the transition zone between the southern and northern segments, the valley narrows to approximately 4 miles wide in the vicinity of Hercules Gap, and then opens up north of McGill. About 14 miles north of McGill, in the vicinity of Monte Neva Hot Springs (located north of the Campbell Embayment), the valley narrows somewhat for about 8 miles and then opens up again. The terminal sink of the northern portion of the valley, Goshute Lake, is located near the north end of the valley. Potentially affected water resources in the southern segment of the

valley were not considered as the proposed and alternative well fields are located in the central and northern portions of the valley.

Available information on the groundwater resources of Steptoe Valley were used to prepare a computer flow model to simulate groundwater conditions in the affected area and assist with predicting impacts of the Proposed Action and Action Alternative water supplies on the groundwater resources. The model developed for evaluating the impacts of the Proposed Action and Action Alternatives on Steptoe Valley groundwater consisted of a single-layer domain, or one unconfined aquifer. The model domain includes the valley fill aquifer that would be the immediate source of groundwater for the proposed pumping scenarios. Information on the stratigraphy of Steptoe Valley from existing well logs and previous studies suggests that the valley fill aquifer has variable hydraulic properties in the vertical and horizontal dimensions; however there is little data on the deeper stratigraphy of the valley due to the lack of deeper wells with detailed well logs (Mayo 2007a). This lack of stratigraphic and quantitative hydraulic data does not support more complex modeling the northern Steptoe Valley with a multi-layer model (EMS-I 2008). The mountains bounding the valley are the principal recharge areas for the valley fill aquifer, and this recharge was estimated and distributed along the boundaries of the model to simulate movement of water from the mountains down into Steptoe Valley (EMS-I 2008). Groundwater inflow into the central portion of the valley from the southern portion was treated as a head boundary in the groundwater model, and there is no perennial surface flow from the southern portion of the valley into the northern portion of the valley.

The baseline groundwater conditions are described in detail in reports prepared by Mayo (2007a) and EMS-I (2008) and are summarized in the following narrative. Full text versions of these two reports are available on the Draft EIS distribution CD to assist those readers who desire a more complete technical discussion.

Background

Numerous regional and local investigations have been conducted on groundwater systems in the Great Basin. At the regional scale, particular interest has been paid to groundwater systems which may: 1) interact with the proposed Yucca Mountain Nuclear Waste facility; 2) have interbasin flow; and 3) be part of the so-called deep carbonate aquifer. Interbasin flow via the deep carbonate aquifer is of particular interest to this analysis of Steptoe Valley because, as discussed below, it is proposed that such interbasin flow affects the Steptoe Valley water budget.

The idea of interbasin flow, and its connection to deep Paleozoic carbonate rocks, which has been attributed to much of the Basin and Range region, was initially described by Winograd (1962), Eakin and Moore (1964), Eakin (1966), and Maxey and Mifflin (1966). In recent years, the idea of interbasin flow has been further developed, and several regional groundwater flow models that incorporate interbasin flow have been developed (Hess and Mifflin 1978; Prudic et. al. 1993; Harrill and Prudic 1998; Nichols 2000; Lopes and Evetts 2004; and Welch and Bright 2007). In simple terms, the idea of interbasin flow in the deep carbonate aquifer is that groundwater recharging in one basin may pass beneath bounding mountain ranges into an adjacent basin via flow in deep carbonate rocks.

The proposed interbasin flow mechanism is important to this analysis because numerous investigators have invoked the mechanism to balance the surface-groundwater budgets for Steptoe Valley. Clancy (1968) calculated a water budget surplus of 3,000 acre-feet in southern Butte Valley and a deficit of 4,800 acre-feet in northern Butte Valley. Both recharge and discharge in the budget were based on estimates where recharge from precipitation and

discharge via ET are the largest factors in recharge and discharge, respectively. No actual measurements of either recharge or discharge were made. Nonetheless, based on the estimated water budget surplus in southern Butte Valley, Clancy (1968) proposed that some recharge might move to northern Butte Valley or Steptoe Valley as underflow through carbonate rocks. Interbasin flow into Steptoe Valley from southern Butte Valley would most likely discharge in the Campbell Embayment. Frick's (1985) groundwater model was not able to resolve the issue of interbasin flow from Butte Valley to the springs in the Campbell Embayment. Prudic et al. (1993) simulated 7,400 acre-feet of regional spring discharge at Campbell Ranch Springs (i.e., Campbell Embayment), which they attributed to the water budget of Eakin et al. (1967). Eakin et al. (1967) specifically rejected interbasin flow from Butte Valley to Steptoe Valley in the Campbell Embayment area (p. 21-22), but utilized 11,600 acre-feet of bedrock interbasin flow from unspecified areas to balance the Steptoe Valley water budget. Additionally Eakin et al. (p. 34, 1967) "most of the ground-water recharge to the valley fill system is supplied by water moving through the consolidated rocks into the valley fill below land surface." Nichols (2000) estimated a net interbasin outflow from Steptoe Valley of 2,000 acre-feet (in Table C11) and a net outflow into Goshute Valley of 4,000 acre-feet (in Table C14). Lopes and Evetts (2004) report net interbasin outflow from Steptoe Valley as 4,000 acre-feet. Welch and Bright (2007) report a net interbasin flow out of northern Steptoe Valley in the vicinity of Currie as 2,000 acre-feet.

Only a few site-specific groundwater investigations of Steptoe Valley have been undertaken. Eakin et al. (1967) completed the first comprehensive investigation of the valley. The report: 1) summarized the geology of the valley and surrounding mountain ranges; 2) described groundwater recharge locations and mechanisms in general terms; 3) presented spring and stream flow measurements made in October 1965, as well as some water chemistry; 4) discussed the affects of pumping; and 5) presented a water budget for the valley.

Leeds et al. (1981a, 1981b, 1983) completed localized geophysical studies, conducted pump test analysis of selected alluvial wells, developed a groundwater flow model, and evaluated potential well field designs for the White Pine Power Project. Frick (1985) developed a three-layer steady state model of the alluvial system in the valley. Layer one simulated an unconfined aquifer from the ground surface to 100 feet below ground surface (bgs). Layer two was the confining layer, and layer three simulated a confined aquifer from 100 to 1,000 feet bgs. Welch and Bright (2007) included Steptoe Valley as part of a regional carbonate aquifer study of eastern Nevada. Although the study was regional, investigation results included considerable data and analysis of Steptoe Valley.

Springs

Steptoe Valley and surrounding mountain blocks support 1,069 springs (Pavelko 2007) (**Figure 3.2-1**). Springs are common in bedrock terrain of the basin-bounding mountain ranges, several of which have been measured and sampled as part of recent baseline studies. Flow measurements and water chemistry of monitored springs are detailed in Table 2 of the Mayo (2007a) report. Some of these springs discharge from fracture flow systems in the bedrock, while a large number discharge from weathering material that covers bedrock slopes. Elsewhere, springs support canyon stream flows in both the Egan and Cherry Creek Ranges. Except for base flow contributions to streams that enter the valley floor, bedrock springs do not impact the water balance of Steptoe Valley.

Groundwater discharges from springs along the base of the alluvial fans, particularly along the east flank of the Egan Range, where dozens of springs discharge in the Campbell Embayment as well as further north, west of southern Goshute Lake. These springs discharge at elevations

of about 6,070 and 5,860 feet amsl in the Campbell Embayment and southern Goshute Lake areas, respectively. Similar clusters of springs do not discharge from the base of alluvial fans along the Schell Creek Range. Most of the water discharging from these springs is lost to infiltration and/or ET, and does not impact the Steptoe Valley water balance.

The water table along the southern reaches of Duck Creek in the valley floor northwest of McGill is commonly at, or near, land surface where it supports springs, gaining flows in the channel, and in the large, marshy and/or meadow wetlands. Noticeable springs are found north of the McGill Tailings impoundments (i.e., McGill Spring) as well as the up-gradient ends of wetlands (i.e., Heusser Spring at the head of Steptoe Slough).

Several thermal springs discharge in the northern valley, including Schoolhouse Spring, Collar and Elbow Spring, McGill Spring, some Campbell Embayment springs, Cherry Creek Hot Spring, and Monte Neva Hot Spring (Frick 1985; Garside 1994). Groundwater is considered thermal if the water temperature is more than 5°C above mean annual air temperature. The mean annual air temperature in Ely-McGill-Lages area is 7 to 8°C, depending on location (Nevada Climate Summaries 2007). Thus, groundwater with a discharge temperature of about 12°C or greater may be considered thermal. Except for Collar and Elbow Spring, all warm springs discharge within 2 miles of the mountain fronts and may be related to mountain front faulting. Almost all the thermal springs have discharge temperatures less than 30°C, except for Monte Neva Hot Spring and Cherry Creek Hot Spring, which have discharge temperatures in excess of 50°C.

The thermal Monte Neva Hot Spring, located west of Duck Creek about midway between McGill and Cherry Creek, is a prominent feature in the valley floor. Thermal water, approximately 77°C, currently issues from the side of a large tufa mound. Based on a self potential (SP) geophysical investigation, Leeds et al. (1981b) concluded that the hot spring orifice is located at the north end of a 650 foot long linear, north-south trending, SP anomaly. They further concluded that the source of the water is a northwest trending fault or fracture zone at a depth of about 330 feet.

Table 3.2-5 shows water chemistry from a range of springs sampled in 2006 and 2007 (Mayo 2007a). More complete data are in the Mayo technical report (Mayo 2007a).

TABLE 3.2-5. WATER CHEMISTRY OF SPRINGS

LOCATION	Q	°C	CND	PH	TDS	CA	MG	NA	K	HCO_3	CL	SO_4	F
	GPM		µS		MG/L								
PALEOZOIC BEDROCK SPRINGS—EGAN RANGE													
North Spring	7.5	5.5	330	7.9	200	56	4.4	6.3	0.0	195	3.8	9.2	0.10
Nine Mile Spring	2.8	4.5	520	7.8	310	69	8.9	22.0	0.0	268	16.0	22.0	0.29
Mustang Spring	1.5	7.6	230	8.3	110	27	5.9	12.0	1.2	122	5.1	9.4	0.29
Hunter Spring	15.0	7.5	360	8.4	170	54	10	10.0	0.0	195	6.9	21.0	0.17
ALLUVIAL FAN SPRINGS – CAMPBELL EMBAYMENT—EGAN RANGE													
Phillips Ranch (Warm)	N/A	22.3	460	7.7	250	50	20	1.0	3.4	220	3.5	18.0	0.34
Phillips Ranch (Cold)	N/A	22.1	460	7.9	240	49	19	9.0	3.4	220	3.5	18.0	0.30
Bennet Spring	1.8	10.3	310	7.8	120	28	20	7.0	2.3	171	5.1	12.0	0.15
THERMAL SPRINGS—EGAN RANGE													
Monte Neva Hot Springs	914	77	N/A	7.5	N/A	42	32	19.9	9.6	322	3.8	22.2	0.94
Salvi Ranch	N/A	>50	790	7.5	500	13	0.0	150	4.9	310	500	15.0	12.0

LOCATION	Q	°C	CND	PH	TDS	CA	MG	NA	K	HCO_3	CL	SO_4	F
	GPM		µS		MG/L								
VOLCANIC BEDROCK SPRINGS—SCHELL RANGE													
Indian Springs	19.7	12.2	250	8.0	130	27	5.1	17.0	3.0	93	7.2	11.0	0.22
Unnamed Spring (Mattier Creek)	276	15.3	460	7.5	200	54	21	6.4	0.0	220	3.1	23.0	0.16
Unnamed Spring (Schellbourne Creek)	315	22.1	470	7.4	200	61	19	4.1	0.0	220	2.8	20.0	0.14
ALLUVIAL FAN SPRINGS—SCHELL RANGE													
Trough Spring	0.24	7.6	370	7.8	200	41	9.9	20.0	4.8	207	12.0	14.0	0.39
Becky Spring	3.75	14.6	580	7.7	300	63	12	42.0	4.2	256	35.0	37.0	0.44
Unnamed Spring 3	4.02	13.9	450	8.2	310	67	3.0	20.0	0.0	170	56.0	56.0	0.17
ALLUVIAL SPRINGS – STEPTOE VALLEY FLOOR													
Collar & Elbow Spring	N/A	21.9	440	7.6	240	52	19.0	9.8	3.0	244	6.1	21.0	0.33

Source: Mayo 2007a, Note: Some numbers have been rounded from Mayo

Aquifer Properties

Only limited data are available regarding aquifer properties for the Steptoe Valley fill. Eakin (1966) reported very high transmissivity of approximately 200,000 gallons per day per foot (gpd/ft) in fractured carbonate rock in the White River Valley and Coyote Springs areas in Nevada. Leeds et al. (1981b) reported transmissivity of 440 to 1,250 gpd/ft for unfractured Ely Limestone in southern Steptoe Valley. The transmissivity of the alluvium in Steptoe Valley varies greatly with the depositional environment. In alluvial fan deposits along the base of the Schell Creek Range, just south of Cherry Creek Road, Leeds et al. (Table 3.3, 1981b,) reported transmissivity of 94,000 to 160,000 gpd/ft for wells 1A, 1B, and 1C. Elsewhere in the valley, they reported an alluvial fan transmissivity of 51,100 gpd/ft and a storage coefficient of 1.7-2.5 x 10^{-4}, which indicates a confined aquifer, and a playa (i.e., central valley fill) transmissivity of 9,200 to 29,300 gpd/ft (Leeds et al., Table 4.1, 1981b). Welch and Bright (2007) report ranges of hydraulic conductivity (ft/day) for the aquifer materials, including the bedrock, found in eastern Nevada. Values in ft/day cannot be directly compared with transmissivity because aquifer thickness must be known to convert ft/day units into transmissivity units.

At Lages Station, shallow unconfined (less than 300 feet) and deep confined (greater than 400 feet) aquifers have locally been identified. Converse Consultants performed aquifer analysis by pumping wells completed in both the unconfined and confined aquifers and measuring water level responses in monitoring wells located approximately 3,000 to 10,000 feet away (Mayo 2007a). Based on the aquifer analysis, the unconfined aquifer has a transmissivity of approximately 21,000 gpd/ft and the confined aquifer has a transmissivity of 130,000 to 250,000 gpd/ft. The calculated storage coefficient of the confined aquifer ranged from 10^{-3} to 10^{-4}. A storage coefficient of 10^{-3} suggests leaky conditions, meaning that the confining material will permit a limited amount of vertical flow between underlying and overlying water bearing horizons. However, the confined aquifer monitoring wells are also screened in the unconfined aquifer; thus, the calculated storage coefficients represent the combined unconfined-confined aquifer.

Water Budget

Several researchers have developed groundwater budgets for the valley, as shown in Table 4 of the Mayo (2007a) report. Each budget contains recharge and discharge components with

recharge from precipitation and discharge from ET as the largest factors for each. Annual recharge estimates vary between 85,000 and 132,000 acre-feet per year, and discharge estimates vary between 71,000 and 132,000 acre-feet per year. Interbasin inflow is not a recharge source in most of the budgets, but several include 1,000 to 4,000 acre-feet of interbasin outflow. Most water budgets balance reasonably well; however, Eakin et al. (1967) presented a somewhat confusing water budget picture. One of the Eakin et al. (1967) budgets has a discharge deficit of 14,000 acre-feet and no interbasin flow. However, they also include a water budget that includes all input and output parameters, not just recharge and ET. In this budget, total inflow, including all precipitation, runoff, and groundwater inputs, is 639,000 acre-feet and all outflow, including all ET associated with precipitation, runoff, groundwater, and interbasin flow, is 640,000 acre-feet. In the recharge of the Eakin et al. (p. 35, 1967) budget, interbasin flow, stream runoff, and valley fill precipitation are 41,000, 24,000, and 5,400 acre-feet, respectively. According to the Nevada Division of Water Resources (as reported in Appendix C of EMS-I [2008]), the annual yield for Steptoe Valley is 70,000 acre-feet.

For the groundwater modeling conducted as part of this investigation, a flow budget was developed to reflect the steady-state model calibration based on current conditions. In accordance with Eakin et al. (1967), water was permitted to enter the model via recharge from precipitation to the alluvial fans in the amount of 4,500 acre-feet, as well as lateral inflow from adjacent ranges in the amount of 24,000 acre-feet. Water also entered the model domain from stream leakage in the amount of 32,000 acre-feet, and from inflow at the southern boundary in the amount of 2,000 acre-feet. Groundwater discharge primarily occurs as ET and from consumptive use, and model values were attributed as 75,000 and 13,000 acre-feet respectively. Interbasin flow was addressed as 3,400 acre-feet of discharge near the northern extent of the model, corresponding to a gap between Steptoe Valley and the basin to the north. A detailed description of the groundwater model flow budget can be found in Section 3.3.5 of EMS-I (2008).

The USGS Basin and Range Regional Carbonate-rock Aquifer System (BARCAS) report, presents the findings of a groundwater budget modeling effort of the Steptoe Valley Basin conducted jointly by the USGS and the Nevada Desert Research Institute (Welch and Bright 2007). ET was calculated based on land cover (e.g., marshland, grassland, dense desert shrubland, open water, etc.). These results were analyzed to develop a water budget for the basin. The study found that groundwater must leave the Steptoe Valley Basin through interbasin movement into adjacent valleys to achieve a water balance for Steptoe Valley (Welch and Bright 2007; Bright 2007). In practice, groundwater is pumped for consumptive use and storage volume may increase or decrease annually, depending on precipitation, ET, pumpage, and other factors.

Water Rights

Water rights within the Steptoe Valley basin vary in type from surface water to shallow- and deep-aquifer diversion points. A review of the NDWR water right database shows that, for the period of 1901 through July 2007, a total of 2,053 water rights have been applied for in the Steptoe Valley basin. For each water right, the database provided general information regarding the status of the application (i.e., reserved, relinquished, abandoned, forfeited, etc.). Water right source types within Steptoe Valley included effluent, geothermal, lake, reservoir, spring, stream, underground, other ground water, and other surface water. A summary of water right types by status is provided in **Table 3.2-6.** A description of water rights utilized for the groundwater model domain is provided in Section 2.7 of EMS-I (2008).

According to the *Hydrographic Basin Summary by Manner of Use* (Appendix C, EMS-I 2008), a total of approximately 95,400 acre-feet per year of water has been appropriated by the NDWR. However, adjustments were made based on guidance provided by NDWR, thus reducing actual usage to approximately 24,000 acre-feet per year, of which approximately 18,800 acre-feet per year are employed as groundwater pumping for irrigation purposes (Appendix B, EMS-I 2008).

TABLE 3.2-6. SUMMARY OF WATER RIGHTS – STEPTOE VALLEY BASIN

WATER RIGHT STATUS	SOURCE TYPE								
	EFFLUENT	GEO-THERMAL	LAKE	RESERVOIR	SPRING	STREAM	UNDER-GROUND	OGW[1]	OSW[2]
Abandoned	--	--	--	--	1	--	--	--	--
Abrogated	--	--	1	--	10	26	148	1	1
Application	--	--	--	--	--	--	9	--	--
Cancelled	2	3	1	--	106	83	308	2	3
Certificate	1	--	--	1	162	40	250	5	16
Decreed	--	--	--	--	--	2	--	--	--
Denied	--	--	1	--	90	30	109	1	1
Expired	--	--	--	--	--	--	79	1	--
Permit	1	--	2	--	7	28	150	7	--
Reserved	--	--	--	--	13	--	--	--	--
Ready for Action	--	--	--	--	7	4	22	1	--
Ready for Action (Protested)	--	--	--	--	4	8	21	--	3
Superceded	--	--	--	--	1	1	--	--	1
Vested	--	--	--	--	72	22	1	--	1
Withdrawn	--	--	--	--	42	45	85	1	4

[1] Other Ground Water
[2] Other Surface Water
(Source: http://water.nv.gov/ (NDWR 2006))

Groundwater Quality

The Mayo report (2007a) found groundwater chemistry consistent with the geology of the basin, depending on well location and time of residence. Tritium concentration was used as a means of determining the age of groundwater. Both confined and unconfined areas of the valley fill alluvial aquifer were sampled, as were springs and wells in the alluvial fans at the valley margins, and surface water sources (perennial and ephemeral stream reaches) (Mayo 2007a). The report does not note that any anthropogenic influences on groundwater chemistry were found. **Table 3.2-7** shows water chemistry from wells sampled in 2006 and 2007 (Mayo 2007a).

State endorsed wellhead protection plans are in place for the community water systems in Ely and Baker, and plans are being prepared in Ruth and McGill (NDEP 2008; NDEP 2007b).

TABLE 3.2-7. GROUNDWATER CHEMISTRY

LOCATION	°C	CND	PH	TDS	CA	MG	NA	K	HCO_3	CL	SO_4	F	14C AGE
		µS		MG/L									YRS
STEPTOE VALLEY FLOOR - VALLEY WELLS - ALLUVIUM													
WW-1	25.6	210	8.7	190	19	4.4	27.0	7.3	146	3.7	9.8	0.46	12,500
WW-2	24.8	370	8.4	190	35	7.2	25.6	6.6	210	5.4	14.0	0.37	2,200
#1 Well	N/A	N/A	N/A	N/A	44	20.0	8.1	1.5	190	3.7	13.0	0.00	N/A
#3 Well	N/A	N/A	N/A	N/A	39	24.0	50.0	8.3	270	23.0	34.0	0.37	N/A
#2 Well	N/A	N/A	N/A	N/A	44	13.0	22.0	8.4	190	52.0	46.0	0.40	N/A
#5 Well	N/A	N/A	N/A	N/A	28	4.8	27.0	5.6	146	6.4	14.0	0.36	N/A
STEPTOE VALLEY FLOOR – LAGES JUNCTION WELLS - UNCONFINED													
Well 9440	12.8	1640	7.8	1200	170	73.0	55.0	16.0	112	290	270	0.32	8,500
Henriod X Well	14.2	N/A	7.8	2800	460	130	210	18.0	110	790	800	0.36	N/A
STEPTOE VALLEY FLOOR – LAGES JUNCTION WELLS - CONFINED													
MW-1-DW	12.3	430	7.2	260	24	7.6	45.0	7.7	160	10.0	26.0	0.39	9,200
Well 10105	16.4	320	8.0	200	24	8.7	21.0	8.6	134	13.0	18.0	0.55	10,000
Well 10106	18.4	270	8.0	180	29	6.5	15.0	7.9	134	6.2	18.0	0.43	8,500
Mystery Well	17.3	300	7.5	160	31	6.4	14.0	6.9	146	8.2	23.0	0.50	10,000

Source: Mayo 2007a. Note: Some numbers have been rounded from Mayo

3.3 Geology and Minerals

The project area, shown in **Figure 1.1-1**, is located within the Basin and Range Physiographic Province, which primarily comprises the state of Nevada, western Utah, and southeastern Idaho and Oregon (Eaton 1979). This province owes its name to the general geologic history common to this part of the country that has given rise to the present-day landscape of altering generally north-south trending mountains separated by intervening valleys or basins.

The geologic units in the vicinity of the project area range from Precambrian in age to recent Quaternary deposits. **Figure 3.3-1** is a generalized stratigraphic nomenclature of the project area (BLM 2003). While the current landscape formed during the past 10 to 20 million years, the geologic history of the region contains important features dating to the Precambrian era (more than 550 million years before present).The metamorphic rocks (quartzites and schist) of the Precambrian age are the oldest and lowest units in the regional stratigraphic column and are, therefore, commonly referred to as "basement rocks." Early Cambrian age formations (approximately 500 million years before present) consist principally of quartzite and shale. Typically, they are also considered basement rocks largely because of their relatively impermeable nature with respect to ground water flow (Peterson and Grow 1995).

Throughout the Paleozoic era, beginning in the early Cambrian time and continuing into the Permian period (approximately 250 million years before present), present-day eastern Nevada formed the continental shelf off of what was then the west coast of North America. This shallow marine environment gave rise to the deposition of massive sequences of carbonate rocks (such as limestone and dolomites) that accumulated to thicknesses of as much as 30,000 feet. The area that formed the ancient continental shelf stretched from present-day southern Idaho, across western Nevada, to southeastern California. The resulting carbonate deposits are exposed in the many mountain ranges and form a thick wedge, generally thinning eastward, that constitutes an extensive regional feature commonly referred to as the Carbonate Rock Province. The thickness and composition of the Paleozoic carbonate rocks are notable in their homogeneity over large areas in the province (Peterson and Grow 1995).

The Permian period (between 240 and 290 million years before present) generally marked the end of the environment that produced the thick deposits of carbonate rock. By the middle Triassic (225 million years before present) the continental margin began to shift westward so that present-day eastern Nevada became an area of continental deposition. Rocks of middle Triassic to early Jurassic age in eastern Nevada, therefore, largely consist of sandstone, shale, and freshwater limestone (Tschanz and Pampeyan 1970; Hose and Blake 1976).

During the late Mesozoic Era, the Sevier Orogeny (a period of mountain building) occurred due to extensive regional compression of the earth's crust, by and large, along the same belt that formed the ancient continental shelf (during Paleozoic time) that runs from southern Idaho through western Utah and southeastern California (Rowley and Dixon 2001).

The geologic structure of the region became more complex in the middle and late Tertiary period (starting around 20 million years ago) when the tectonic forces reversed, resulting in crustal extension. The entire region underlying present-day eastern Nevada was essentially pulled apart by tensional forces. Large-scale normal (vertical offset) faulting caused huge blocks of crust to be dropped, tilted, or rotated in response to being pulled apart. In addition to extensive normal faulting, nearly vertical strike-slip (lateral offset) faulting also occurred during the middle and late Tertiary times. The overall result of the east-west extensional tectonics was that north-south oriented mountain ranges (horsts) were raised and tilted, and basins (grabens) formed in the intervening depressed areas. Erosion of the mountain ranges and the subsequent deposition of the erosional debris filled the valleys with several hundred to several thousand feet of sediment. The resulting parallel sequence of mountain ranges and intervening basins, interspersed with mountains of volcanic origin, combine to give the region its characteristic basin-range topography seen today (Rowley and Dixon 2001).

3.3.1 Area of Analysis

The proposed project disturbance areas, including the North and South Plant Sites, electric transmission corridors, transportation corridors, and water supply facilities, are included in the area of analysis. Construction and excavation associated with many of the sites and corridors has the potential to impact localized geology and mineral and energy resources.

3.3.2 Data Sources and Methods

This section discusses the geological and mineral resources within the project area for the EEC. Although specific aspects of the geology of White Pine County are described in several reports and publications, the principal source of geological information for this EIS is Hose and Blake (1976). Additional data on mining claims, oil and gas leases, and geothermal leases were obtained from the BLM's LR 2000 database.

3.3.3 Existing Conditions

3.3.3.1 Local Geology

All of the components of the Proposed Action and Action Alternatives are located in Elko, White Pine, Lincoln, Nye, and Clark Counties. A geologic map of the project area is shown in **Figures 3.3-2a** through **3.3-2c** with the explanation on **Figure 3.3-3**.

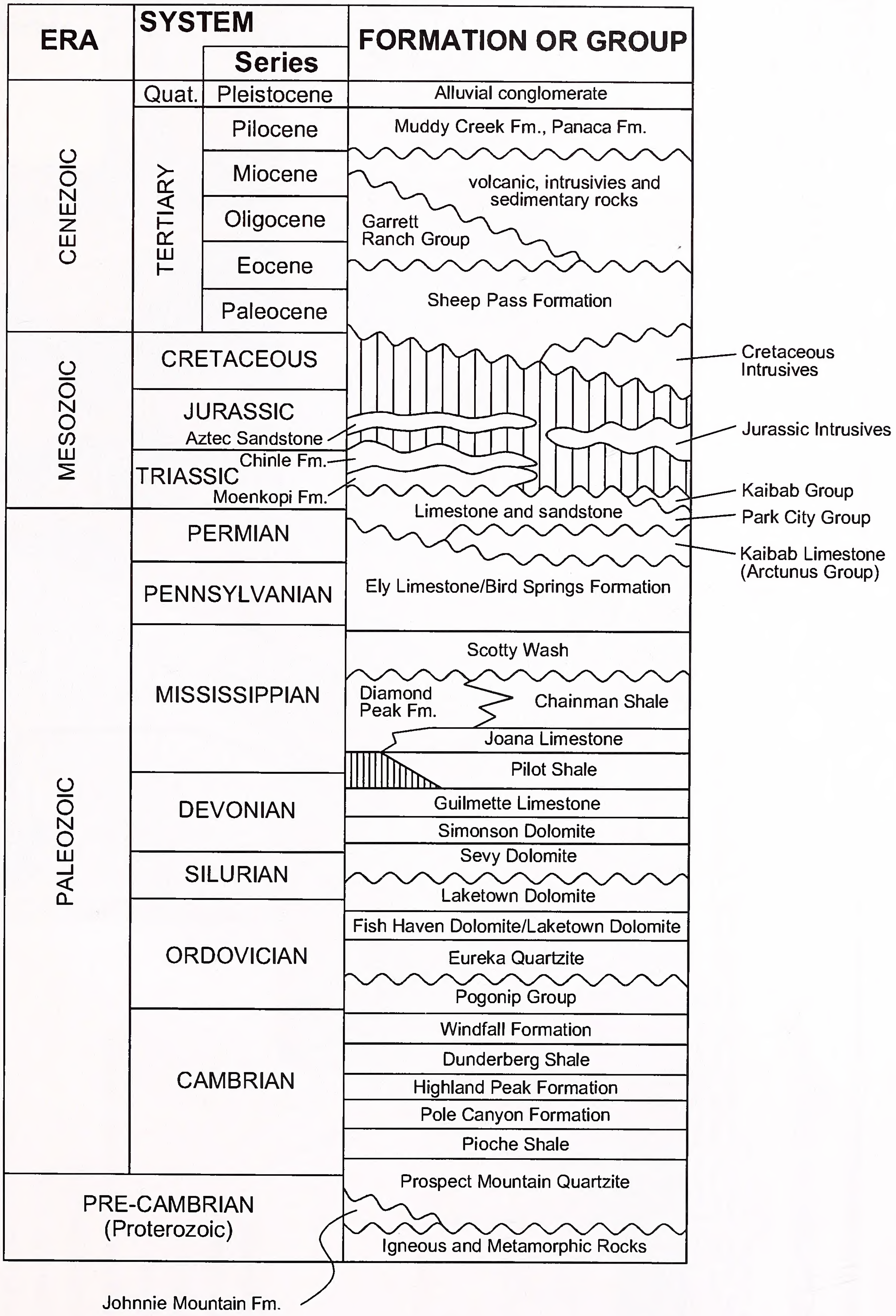
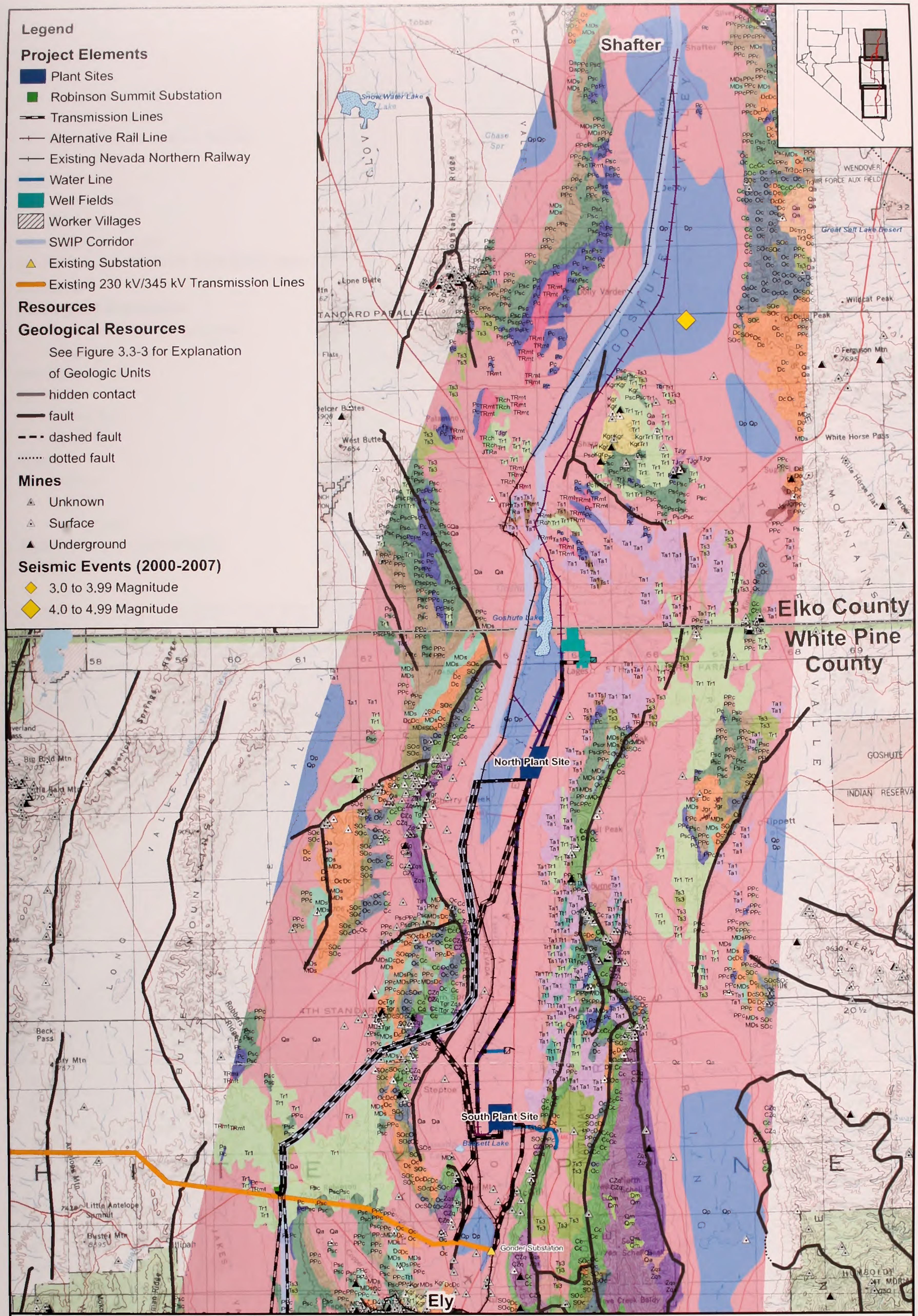


FIGURE 3.3-1
STRATIGRAPHIC COLUMN
ELY ENERGY CENTER

Source: Modified from Peterson and Grow (1995).



Source - Mines: USGS Mineral Resources Online Data (through 2003)
Seismic: UNR Seismology Lab, University of Nevada, Reno (date range: 1/1/00 through 4/13/07)
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno)

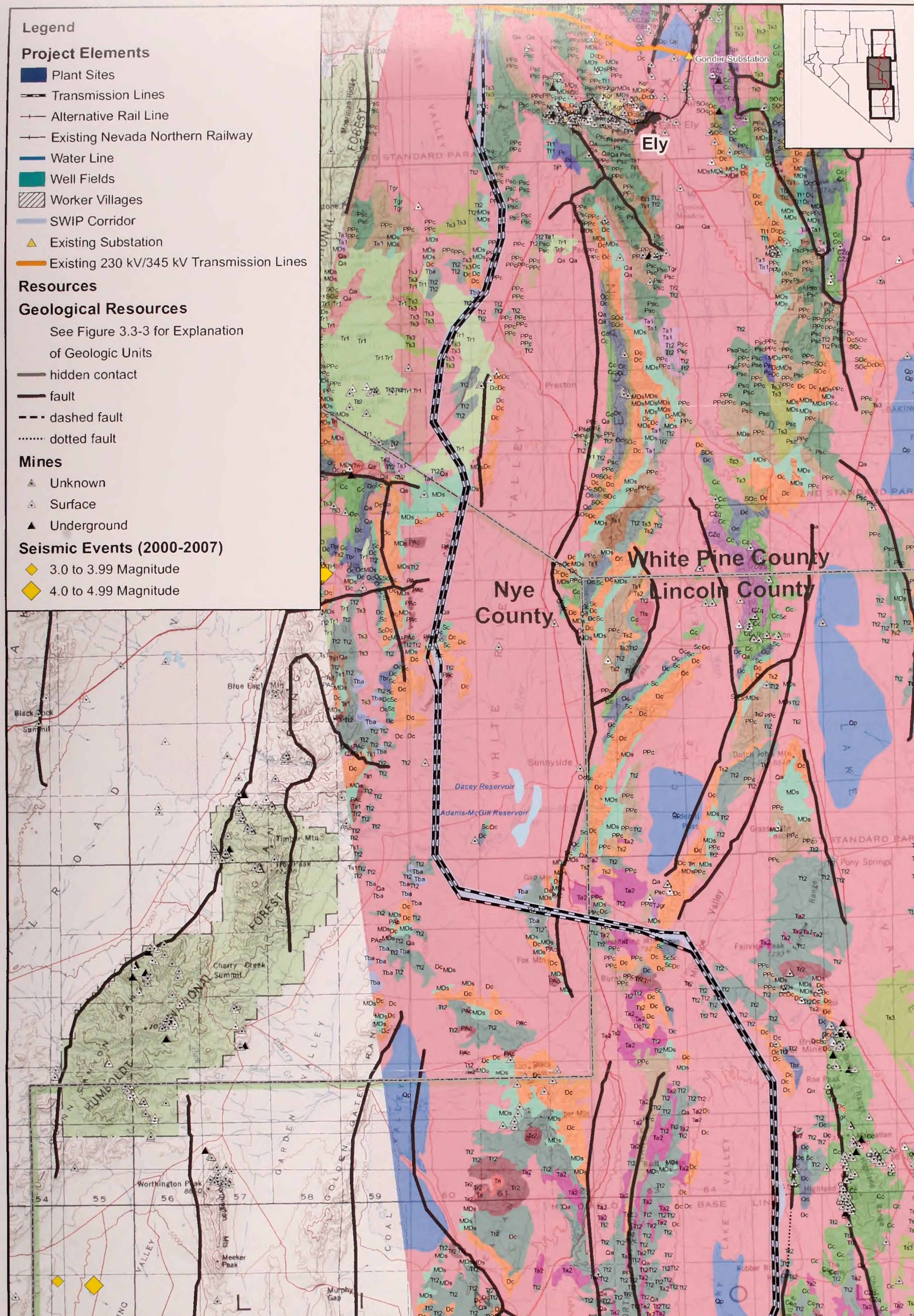
1:500,000

10 0 10 Miles

10,000 0 10,000 Meters

Scale is 1:500,000 when printed at 11"x17"

FIGURE 3.3-2a
GEOLOGICAL RESOURCES
ELY ENERGY CENTER



Source - Mines: USGS Mineral Resources Online Data (through 2003)
Seismic: UNR Seismology Lab, University of Nevada, Reno (date range: 1/1/00 through 4/13/07)
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno)

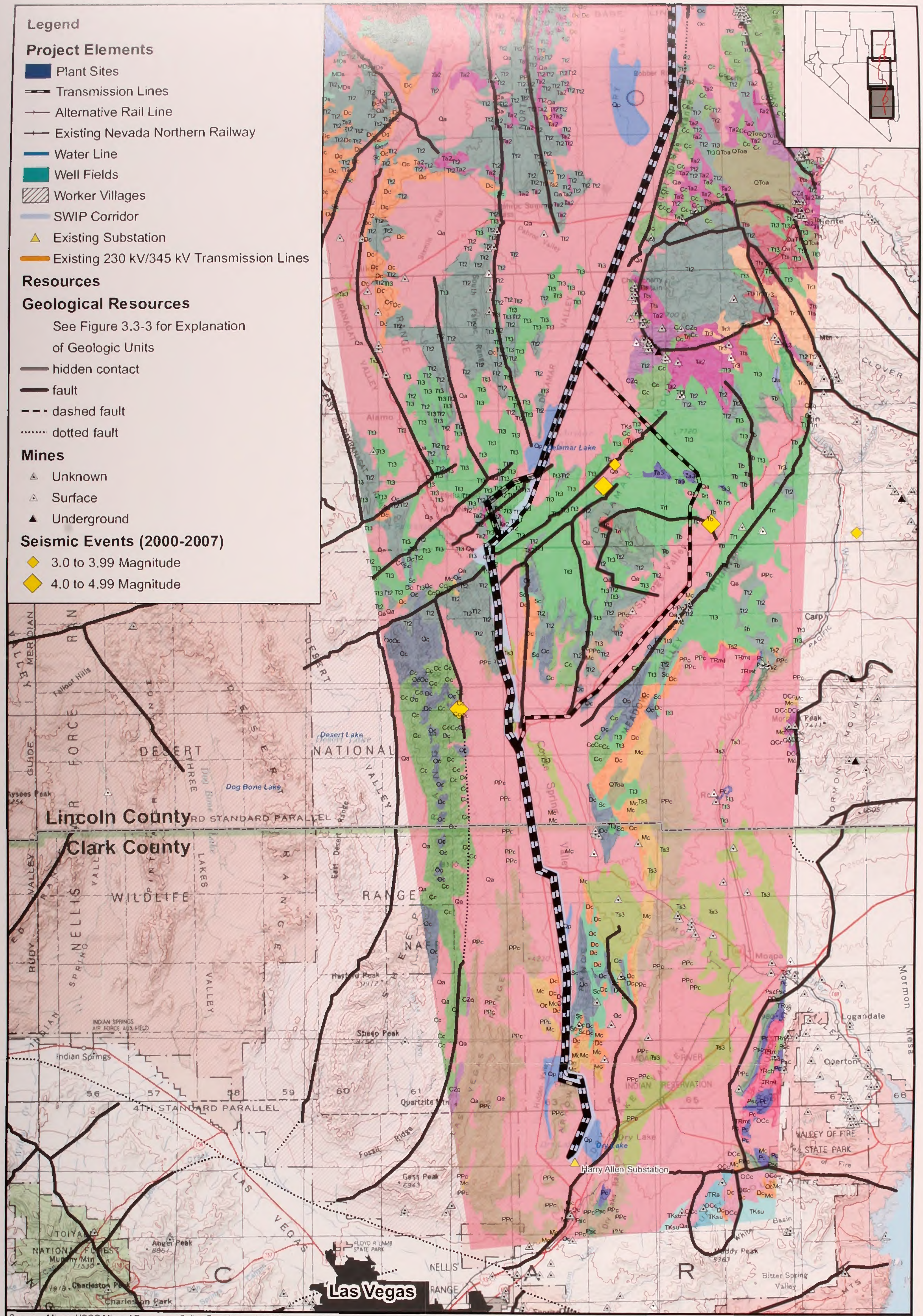
1:500,000

10 0 10 Miles

10,000 0 10,000 Meters

Scale is 1:500,000 when printed at 11"x17"

FIGURE 3.3-2b
GEOLOGICAL RESOURCES
ELY ENERGY CENTER



Source - Mines: USGS Mineral Resources Online Data (through 2003)
Seismic: UNR Seismology Lab, University of Nevada, Reno (date range: 1/1/00 through 4/13/07)
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno)

1:500,000

10 0 10 Miles

10,000 0 10,000 Meters

Scale is 1:500,000 when printed at 11"x17"

FIGURE 3.3-2c
GEOLOGICAL RESOURCES
ELY ENERGY CENTER

EXPLANATION OF GEOLOGIC MAP UNITS

CENEZOIC	QUATERNARY	Qa, ALLUVIAL DEPOSITS
		Qp, PLAYA, MARSH, AND ALLUVIAL-FLAT DEPOSITS, LOCALLY ERODED
	TERTIARY	Ta1, ANDESITE AND RELATED ROCKS OF INTERMEDIATE COMPOSITION
		Ta2, ANDESITE AND RELATED ROCKS OF INTERMEDIATE COMPOSITION
		Ta3, ANDESITE AND RELATED ROCKS OF INTERMEDIATE COMPOSITION
		Tb, BASALT FLOWS
		Tba, ANDESITE AND BASALT FLOWS
		Tbr, BRECCIA
		Tgr, GRANITIC ROCKS
		Tmi, INTRUSIVE ROCKS OF MAFIC AND INTERMEDIATE COMPOSITION
		Tr1, RHYOLITIC FLOWS AND SHALLOW INTRUSIVE ROCKS
		Tr2, RHYOLITIC FLOWS AND SHALLOW INTRUSIVE ROCKS
		Tr3, RHYOLITIC FLOWS AND SHALLOW INTRUSIVE ROCKS
		Tri, RHYOLITIC INTRUSIVE ROCKS
		Trt, ASH-FLOW TUFFS, RHYOLITIC FLOWS, AND SHALLOW INTRUSIVE ROCKS
		Ts1, SEDIMENTARY ROCKS
		Ts2, TUFFACEOUS SEDIMENTARY ROCKS
		Ts3, TUFFACEOUS SEDIMENTARY ROCKS
		Tt1, WELDED AND NONWELDED SILICIC ASH-FLOW TUFFS
		Tt2, WELDED AND NONWELDED SILICIC ASH-FLOW TUFFS
		Tt3, WELDED AND NONWELDED SILICIC ASH-FLOW TUFFS
		Tts, ASH-FLOW TUFFS AND TUFFACEOUS SEDIMENTARY ROCKS
		TKs, CONTINENTAL SEDIMENTARY ROCKS
		TKsu, CONTINENTAL SEDIMENTARY ROCKS
MESOZOIC	CRETACEOUS	Kgr, GRANITIC ROCKS
	JURRASSIC	Jgr, SILVER CREEK
		JTRa, AZTEC SANDSTONE
	TRIASSIC	TRch, CHINLE FORMATION
		TRmt, MOENKOPI FORMATION AND THAYNES FORMATION
PALEOZOIC	PERMIAN	Psc, ARCTURUS (NORTH) / COCONINO (SOUTH)
		Pc, REIPE SPRINGS LINESTONE / RIBHILL SANDSTONE
	PENNSYLVANIAN	PPc, ELY LIMESTONE (NORTH) / BIRD SPRINGS FORMATION (SOUTH)
	MISSISSIPPIAN	Mc, PILOT SHALE / JOANA LIMESTONE / CHAINMAN SHALE (NORTH/ / MONTICRISTO LIMESTONE (SOUTH)
		MDs, UNDIFFERENTIATED MISS / DEV SHALE, SILTSTONE, SANDSTONE, CONGLOMERATE
	DEVONIAN	Dc, GUILMETTE FORMATION
		DCc, UNDIFFERENTIATED DEVONIAN / CAMBRIAN DOLOMITE AND LIMESTONE
	SILURIAN	Sc, LAKETOWN DOLOMITE
		SOc, FISH HAVEN (NORTH) / LAKETOWN DOLOMITE (SOUTH)
	ORDOVICIAN	Oc, KANOSH SHALE / LEHMAN FORMATION / EUREKA QUARTZITE
		OCc, UNDIFFERENTIATED ORD / CAMBRIAN DOLOMITE AND LIMESTONE
	CAMBRIAN	Cc, PIOCHE SHALE AND ELDORADO LIMESTONE
		Css, PROSPECT QUARTZITE
		CZq, QUARTZITE AND MINOR AMOUNTS OF CONGLOMERATE, PHYLLITIC SILTSTONE, LIMESTONE, AND DOLOMITE
PRECAMBRIAN		Zqs, QUARTZITE, PHYLLITIC SILTSTONE, CONGLOMERATE, LIMESTONE, AND DOLOMITE

FIGURE 3.3-3
EXPLANATION OF GEOLOGIC MAP UNITS
ELY ENERGY CENTER

The valleys of the project area consist of tectonic basins created by vertical offset along the principal north-south trending range-front geologic faults at the base of the various mountain ranges to the east and to the west. These deposits have been documented to measure up to 3,000 feet thick (see **Section 3.2.3.5** for additional and more comprehensive information).

The valley-fill deposits generally include the entire spectrum of unconsolidated sediment textures from clay and silt to sand and gravel, deposited in interbedded layers of various mixtures. The valley-fill material is produced by erosion of the surrounding mountains. The resulting sediment is transported into the valleys by the various streams and creeks that drain the mountain slopes and subsequently deposit the material in alluvial fans that eventually coalesce and fill the valleys to their present elevations. Some valleys also contain fine-grained deposits laid down in localized rivers and/or lakes that occupied the low areas of the valleys.

3.3.3.2 Geologic Faults and Seismicity

There are 26 faults and fault zones (**Table 3.3-1**, and **Figures 3.3-2a** through **3.3-2c**) that occur within the Project's alignments, all of which are normal faults with the exception of the Kane Spring Wash fault, which is a sinistral, left lateral fault (USGS 2007a).

These generally north-south trending fault systems are mapped over lengths up to 100 miles, and are included in the USGS Quaternary Fault Database indicating that some movement has occurred along these fault systems within the last 1.6 million years. Of these Quaternary aged faults, the most active faults, with respect to either the Proposed Action or Action Alternatives, are in northern Jakes Valley located along the base of the eastern flank of the White Pine Range west of Ely (USGS 2007a). Active faults are typically considered to have had movement within the last 10,000 years (USGS 2006).

No major earthquakes (greater than magnitude of 5.0) have been recorded within the immediate project area since at least 1852 (Yeats et al. 1997). **Figures 3.3-2a** through **3.3-2c**, show the most recent earthquake locations in the project area and readings dating back to 2000.

TABLE 3.3-1. FAULTS AND FAULT ZONES WITHIN STUDY AREA

FAULTS	USGS FAULT NUMBER	COUNTY	PROJECT SEGMENT	FAULT TYPE	FAULT AVERAGE STRIKE	FAULT DIP	LAST TIME OF DEFORMATION	FAULT SLIP-RATE
DOLLY VARDEN MOUNTAINS FAULT ZONE	1712	ELKO	RAIL LINE	NORMAL	N25EW	W, SW	Q (<1.6 MA)	< 0.2 MM/YR
BOONE SPRING HILLS FAULT ZONE	1724	ELKO/ WHITE PINE	RAIL LINE, LAGES STATION WELL FIELD, POWER PLANT ALTERNATIVE	NORMAL	N19EW	W	Q (<1.6 MA)	< 0.2 MM/YR
STEPTOE VALLEY FAULT SYSTEM	1272	ELKO/ WHITE PINE	RAIL LINE, LAGES STATION WELL FIELD, NORTH POWER PLANT SITE, SEGMENTS 1A,1B,1C, 1D, 3, AND 4A	NORMAL	N2EE	E	LATE Q (<130 KA)	< 0.2 MM/YR
CENTRAL STEPTOE FAULT ZONE	1238	WHITE PINE	RAIL LINE, LAGES STATION WELL FIELD, NORTH POWER PLANT SITE, SOUTH POWER PLANT SITE, SEGMENTS 1A,1B,1C, 3, AND 4A	NORMAL	N9EE	W	LATE Q (<130 KA)	< 0.2 MM/YR
UNNAMED FAULT OF WESTERN EGAN RANGE	1274	WHITE PINE	SEGMENTS 1A,1B,1C, 3, AND 4A	NORMAL	N2EW	W	Q (<1.6 MA)	< 0.2 MM/YR
UNNAMED FAULT NORTHEAST OF KIMBERLY	1237	WHITE PINE	SEGMENTS 1D, 1E, 1F, 1G, 6A, 6B AND 6C	NORMAL	N24EW	NE	Q (<1.6 MA)	< 0.2 MM/YR
UNNAMED FAULT SOUTH OF RIPETOWN	1236	WHITE PINE	SEGMENTS 1D, 1E, 1F, 1G, 6A, 6B AND 6C	NORMAL	N16EW	W	Q (<1.6 MA)	< 0.2 MM/YR
UNNAMED FAULTS IN NORTHERN JAKES VALLEY	1224	WHITE PINE	SEGMENTS 1D, 1E, 1F, 1G, 6A, 6B AND 6C	NORMAL	N41EE	NW	LATEST Q (<15 KA)	< 0.2 MM/YR
EAST JAKES VALLEY FAULT ZONE	1225	WHITE PINE	SEGMENT 6A	NORMAL	N1EW	W	LATE Q (<130 KA)	< 0.2 MM/YR
PRESTON FAULT	1389	WHITE PINE	SEGMENT 6A	NORMAL	N15EE	E, SE, NW	LATE Q (<130 KA)	< 0.2 MM/YR

FAULTS	USGS FAULT NUMBER	COUNTY	PROJECT SEGMENT	FAULT TYPE	FAULT AVERAGE STRIKE	FAULT DIP	LAST TIME OF DEFORMATION	FAULT SLIP-RATE
WHITE RIVER VALLEY FAULT ZONE	1398	LINCOLN/ WHITE PINE/ NYE	SEGMENT 6A	NORMAL	N7EE	W	LATE Q(<130 KA)	< 0.2 MM/YR
UNNAMED FAULT NEAR CURRANT CREEK SUMMIT	1386	WHITE PINE/ NYE	SEGMENT 6A	NORMAL	N2EE	E	Q (<1.6 MA)	< 0.2 MM/YR
UNNAMED FAULT NORTHEAST OF CURRENT CREEK SUMMIT	1387	WHITE PINE	SEGMENT 6A	NORMAL	N47EE	NW	Q (<1.6 MA)	< 0.2 MM/YR
PRESTON FAULT	1389	WHITE PINE	SEGMENT 6A	NORMAL	N15EE	E, SE, NW	LATE Q (<130 KA)	< 0.2 MM/YR
THE COVE FAULT	1390	WHITE PINE/ NYE	SEGMENT 6A	NORMAL	N31EE	E, SE	LATE Q (<130 KA)	< 0.2 MM/YR
UNNAMED FAULTS IN WHITE RIVER VALLEY	1397	NYE	SEGMENT 6A	NORMAL	N35EE	NW, SW	LATE Q (<130 KA)	< 0.2 MM/YR
MURPHY MEADOWS FAULT	1396	NYE	SEGMENT 6A	NORMAL	N54EE	NW	LATE Q (<130 KA)	< 0.2 MM/YR
UNNAMED FAULT NEAR FOX MOUNTAIN	1401	NYE	SEGMENT 6A	NORMAL	N69EW	NW, N	Q (<1.6 MA)	< 0.2 MM/YR
WHITE RIVER FAULT	1403	LINCOLN	SEGMENTS 6A AND 8	NORMAL	N5EW	W	Q (<1.6 MA)	< 0.2 MM/YR
DRY LAKE FAULT	1124	LINCOLN	SEGMENTS 6A AND 8	NORMAL	N8EE	W, E	LATE Q (<130 KA)	< 0.2 MM/YR
DELAMAR VALLEY FAULT	1127	LINCOLN	SEGMENT 8	NORMAL	N12EE	W	Q (<1.6 MA)	< 0.2 MM/YR
DELAMAR MOUNTAINS FAULT	1126	LINCOLN	SEGMENTS 8, 9B, AND 10	NORMAL	N7EE	W	MID AND LAKE Q (<750 KA)	< 0.2 MM/YR
KANE SPRING WASH FAULT	1123	LINCOLN	SEGMENTS 9D, 10, AND 11	SINISTRAL	N37EE	NW	MID AND LAKE Q (<750 KA)	< 0.2 MM/YR

FAULTS	USGS FAULT NUMBER	COUNTY	PROJECT SEGMENT	FAULT TYPE	FAULT AVERAGE STRIKE	FAULT DIP	LAST TIME OF DEFORMATION	FAULT SLIP-RATE
MAYNARD LAKE FAULT	1122	LINCOLN	SEGMENTS 9B, 9A, 9C, AND 9D	NORMAL	N35EE	NW, V	LATE Q (<130 KA)	< 0.2 MM/YR
COYOTE SPRINGS FAULT	1121	LINCOLN	SEGMENTS 9B, 9A, 9C, AND 9D	NORMAL	N1EW	W	LATE Q (<130 KA)	< 0.2 MM/YR
SHEEP RANGE FAULT	1164	LINCOLN/ CLARK	SEGMENTS 9B, 9A, 9C, 9D, AND 11	NORMAL	N9EE	E, W	LATE Q (<130 KA)	< 0.2 MM/YR
WILDCAT WASH FAULT	1062	LINCOLN/ CLARK	SEGMENT 11	NORMAL	N4EE	W	MID AND LAKE Q (<750 KA)	< 0.2 MM/YR
ARROW CANYON RANGE FAULT	1061	CLARK	SEGMENT 11	NORMAL	N9EE	W	Q (<1.6 MA)	< 0.2 MM/YR

MA – million years

KA – thousand years

MM - millimeter

The historic level of earthquake potential in eastern central Nevada is relatively low (USGS 2007b). According to the USGS peak acceleration return frequency maps (USGS 2007b), all of the components of the Proposed Action and Action Alternatives are located within an area where the probability is 10 percent that, within the next 50 years, an earthquake capable of generating a ground acceleration of 0.15 g (g is the force of gravity) or less will occur.

On February 21, 2008 a magnitude 6.0 earthquake occurred approximately 6 miles northeast of Wells, Nevada, (30+ miles northwest of Shafter) outside of the EEC project area (UNR 2008). This earthquake caused damage to structures in Wells and was felt by persons in a wide area of northern Nevada (including Ely), southern Idaho, and western Utah. The initial event was followed by numerous, smaller aftershocks.

For context, an earthquake with an intensity of Level VII on the Modified Mercalli Scale equates to an average peak ground gravitational acceleration of between 0.1 and 0.15 g (Bolt 1993). This level of ground acceleration would cause only slight damage to well-built buildings, but would cause considerable damage to poorly built structures. An intensity of Level VII on the Modified Mercalli Scale was used for reference because that is the intensity level anticipated in the project area for the Proposed Action and North Plant Site Alternative in response to a major earthquake according to the seismic zone map in Appendix C of the Uniform Building Code.

3.3.3.3 Mineral and Energy Resources

Authorizations, ROW, and/or Leases Occurring in Project Area

The following lists the energy resources that would be impacted by the project because they occur within the project area:

- Active[1] mining claims
- Oil and gas leases
- Geothermal leases

The individual mining claims, oil and gas leases, and geothermal leases located within the same Township, Range, and Section that a component of the Proposed Action or Action Alternatives occur within are listed in the following sections. Numerous other types of ROWs occur throughout the project area, such as utility and road ROWs.

Authorizations, ROW, and Leases Not Occurring in Project Area

The following lists the energy resources that would not be impacted by the project because they do not occur within the project area and thus are not discussed further in this EIS:

- Coal authorizations
- Solar energy ROWs
- Wind energy ROWs
- Oil shale leases

Mining Districts

Table 3.3-2 lists the Nevada mining districts that are adjacent to and/or would be crossed by the Proposed Action and Action Alternatives. The location of the active mining claims and mining districts can be found on **Figure 3.3-4** below.

[1] "Active" means the claim is in good standing administratively. It does not imply the claim is valid or that there is current mining activity taking place on the claim.

TABLE 3.3-2. MINING DISTRICTS ADJACENT TO OR WITHIN THE PROJECT ROWS

COUNTY / DISTRICT NAME	PROJECT ELEMENT	ACTIVE MINING CLAIMS LEAD FILE NUMBER	PRIMARY COMMODITIES OF MINING DISTRICTS
Elko County			
Pequop	Rail Line		Phosphate, barite
Proctor	Rail Line		Tungsten, silver, copper, limestone
Decoy	Rail Line		Silver, lead, copper, tungsten, titanium
Dolly Varden	Rail Line	NMC956722	Copper, silver, lead, zinc, gold, molybdenum, thorium and rare earths, uranium
White Pine County			
Cherry Creek	Rail Line, Lages Station Well Field, North Power Plant Site, Segments 1A,1B,1C, 1D, 3, and 4A		Silver, gold, lead, copper, zinc, tungsten, antimony, coal, fluorspar, beryllium
Gold Canyon	Rail Line, Lages Station Well Field, North Power Plant Site, Segments 1A,1B,1C, 1D, 3, and 4A		Gold, silver
Schellbourne	Rail Line, Lages Station Well Field, North Power Plant Site, Segments 1A,1B,1C, 1D, 3, and 4A		Silver, tungsten
Seigel	Rail Line, Lages Station Well Field, Segments 1A,1B,1C, 1D, 3, and 4A		Silver, lead, manganese, zinc, gold, tungsten, arsenic
Telegraph	Rail Line, Lages Station Well Field, Segments 1A,1B,1C, 1D, 3, 4A, 1D, 1E, 1F, 1G, 6A, 6B and 6C		Gold, tungsten
Silver Canyon	Rail Line, Lages Station Well Field, Segments 1A,1B,1C, 1D, 3, and 4A		Lead, silver, copper, gold
Ruby Hill	Rail Line, Lages Station Well Field, Segments 1A,1B,1C, 1D, 3, and 4A		Silver
Hunter	Rail Line, Lages Station Well Field, Segments 1A,1B,1C, 1D, 3, 4A, 1D, 1E, 1F, 1G, 6A, 6B and 6C		Lead, copper, silver, gold, uranium

COUNTY / DISTRICT NAME	PROJECT ELEMENT	ACTIVE MINING CLAIMS LEAD FILE NUMBER	PRIMARY COMMODITIES OF MINING DISTRICTS
Granite	Rail Line, Lages Station Well Field, Segments 1A,1B,1C, 1D, 3, 4A, 1D, 1E, 1F, 1G, 6A, 6B and 6C	NMC790940	Lead, silver, gold, tungsten, copper
Duck Creek	Rail Line, Lages Station Well Field, South Power Plant Site, Segments 1A,1B,1C, 1D, 3, and 4A	NMC909041	Lead, silver, copper, zinc, gold, limestone, fire clay
San Francisco	Rail Line, Lages Station Well Field, South Power Plant Site, Segments 1A,1B,1C, 1D, 3, and 4A		Silver, lead
Robinson	Segments 1D, 1E, 1F, 1G, 6A, 6B and 6C	NMC484174	Copper, gold, silver, zinc, lead, iron, manganese, tungsten, molybdenum, rhenium, platinum, palladium, nickel
Currant	Segment 6C		Gold, lead, copper, tungsten, magnesite, uranium, fluorspar
Nye			
Currant	Segment 6C	NMC843483 NMC753739	Gold, lead, copper, tungsten, magnesite, uranium, fluorspar
Lincoln			
Silver King	Segment 6C		Silver, lead, gold, copper
Silverhorn	Segment 6C		Silver, nickel, perelite
Bristol	Segment 6C		Silver, copper, lead, zinc, gold, manganese, montmorillonite
Highland	Segment 6C		Lead, silver, gold, copper, tungsten, manganese, iron
Ely Springs	Segment 6C		Silver, zinc, lead, gold
Comet	Segment 6C		Lead, silver, zinc, gold, copper, tungsten
Chief	Segment 6C		Gold, silver, lead, copper, vanadium
South Pahroc Range	Segment 6C		
Delamar	Segment 6C, 9B, and 10		Gold, silver, copper, lead, perelite
Pennsylvania	Segment 10		Gold, silver, copper
Meadow Valley	Segments 9D, 10, and 11		Gold, silver, uranium
Clark			
Arrow Canyon	Segment 11		Silica, building stone

Source: http://www.blm.gov/landandresourcesreports/rptapp/menu.cfm?appCd=2

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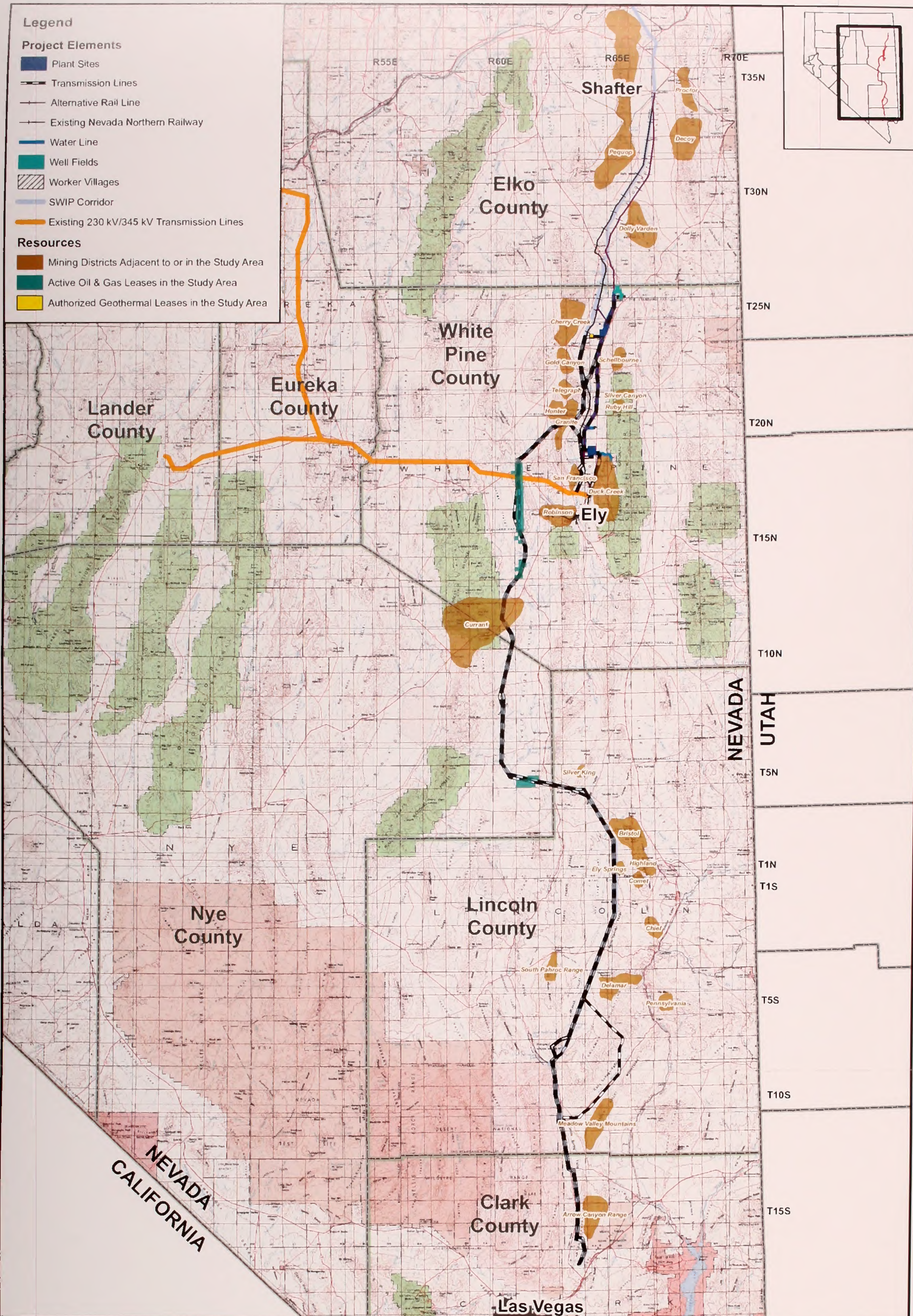


Source - Land Ownership: Bureau of Land Management
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno.

1:1,500,000

10 0 40 Miles

10,000 0 60,000 Meters

Scale is 1:1,500,000 when printed at 11"x17"

FIGURE 3.3-4
MINING DISTRICTS AND LEASES
ELY ENERGY CENTER

Active Oil and Gas Leases

Table 3.3-3 lists the active oil and gas leases that occur within the project area. Locations of the oil and gas leases can be found on **Figure 3.3-4** and in **Table 3.3-3**.

TABLE 3.3-3. ACTIVE OIL AND GAS LEASES WITHIN THE PROJECT AREA

COUNTY	PROJECT SEGMENT	LOCATION	SECTIONS AFFECTED	SERIAL NUMBER	CASE TYPE
White Pine	Segment 1D	T18N R61E	5, 6, 7, 8	NVN082542	311121
White Pine	Segments 1D, 1E, 1F, 1G, 6A, 6B, and 6C	T18N R60E	18, 19	NVN082543	311121
White Pine	Segments 1D, 1E, 1F, 1G, 6A, 6B, and 6C	T18N R60E	31, 32	NVN082544	311121
White Pine	Segments 1D, 1E, 1F, 1G, 6A, 6B, and 6C	T18N R60E	29, 30	NVN082562	311121
White Pine	Segment 1D	T18N R61E	17, 20	NVN083050	311121
White Pine	Segment 1D	T16N R61E	19	NVN083586	315100
White Pine	Segments 1E, 1F, 1G, 6A, and 6B	T18N R60E	13	NVN082117	312021
White Pine	Segment 6C	T17N R61E	6, 7	NVN082242	311121
White Pine	Segment 6C	T17N R61E	29	NVN082512	311121
White Pine	Segment 6C	T17N R61E	5, 8	NVN082537	311121
White Pine	Segment 6C	T17N R61E	17, 20	NVN082538	311121
White Pine	Segment 6C	T17N R61E	17, 18	NVN082539	311121
White Pine	Segment 6C	T17N R61E	30	NVN082540	311121
White Pine	Segment 6C	T17N R61E	31, 32	NVN082541	311121
White Pine	Segment 6C	T16N R61E	20, 29	NVN082090	311121
White Pine	Segment 6C	T16N R61E	5, 8	NVN082205	311121
White Pine	Segment 6C	T16N R61E	6, 7	NVN082206	311121
White Pine	Segment 6C	T16N R61E	17, 18	NVN082207	311121
White Pine	Segment 6C	T16N R61E	19, 30, 31	NVN082207	311121
White Pine	Segment 6C	T16N R61E	32	NVN082536	311121
White Pine	Segment 6C	T15N R61E	5, 7, 17	NVN082089	311121
White Pine	Segment 6C	T14N R61E	8, 19, 16, 17, 20, 29	NVN061766	312021
White Pine	Segment 6C	T13N R61E	31, 32	NVN061767	312021
Nye	Segment 6C	T5N R62E	27-35	NVN058049	311121
Nye	Segment 6C	T5N R61E	23, 24	NVN080576	311121
Nye	Segment 6C	T5N R61E	22	NVN080583	311121

Source: http://www.geocommunicator.gov/NILS-PARCEL2/map.jsp?MAP=ENERGY

Authorized Geothermal Leases

There is only one active authorized geothermal lease within the project area. The location of the authorized geothermal lease can be found on **Figure 3.3-4** and in **Table 3.3-4**.

TABLE 3.3-4. AUTHORIZED GEOTHERMAL LEASE WITHIN THE PROJECT AREA

COUNTY	LOCATION	PROJECT SEGMENT	EXPIRATION OF LEASE	SERIAL NUMBER	CASE TYPE
White Pine County	T24N R64E Sec. 19	Segment 1B	08/31/2016	NVN 080071	321000

Source: http://www.geocommunicator.gov/NILS-PARCEL2/map.jsp?MAP=ENERGY

3.3.4 Specific Project Area Conditions

3.3.4.1 Plant Sites

The South Plant Site, which also includes the Mt. Wheeler Transmission line and the associated worker village, is located in Steptoe Valley, which is 90 miles long and 4 to 10 miles wide and composed of Quaternary coarse alluvial fans, finer basin-fill, and lake bed and playa deposits, referred to as basin-fill deposits for the remainder of this document. This part of the valley is bounded by the Egan Range to the west and the Schell Creek Range to the east.

The northern portion of the valley near the North Plant Site, including the Mt. Wheeler Transmission Line and associated worker village, is bordered by the Cherry Creek Mountains to the west and the Schell Creek Range to the east. The geology at the plant site consists of basin-fill deposits.

3.3.4.2 Electric Transmission Facilities

Segments 1A, 1B, 1C, 3, 4A
These transmission line segments would be located in Steptoe Valley in areas with basin-fill deposits, and the Cherry Creek Mountains and Egan Range to the west and the Schell Creek Range to the east.

Segment 1D
This segment would turn west, crossing the Egan Range to the northwest of the South Plant Site in an approximate 4-mile strip at Dry Canyon, which is composed of Precambrian basement rocks, Paleozoic Ordovician Kanosh shale, Lehman Formation, Eureka quartzite, and Devonian Guilmette limestone.

After descending down the western flank of the Egan Range, the transmission line would cross the basin-fill deposits of Butte Valley. This valley, which is over 50 miles long and 2 to 11 miles wide, is composed of Quaternary basin-fill deposits. The Butte Mountains are to the west and the Egan Range is to the east. The Egan Range in this location is composed primarily of Cenozoic Tertiary rhyolitic flows and shallow intrusives but includes some outcrops of Paleozoic Pennsylvanian Ely limestone, Permian Reipe Springs limestone, Ribhill sandstone, and Arcturus Formation. The transmission line would then climb up into the western arm of the Egan Range on the south end of Butte Valley north-northeast of Robinson Summit. The portion of the Egan Range that would be crossed by the transmission line is composed, primarily, of Cenozoic Tertiary extrusive rhyolitic flows and shallow intrusive volcanic rocks, but also includes some outcrops of Precambrian basement rocks, Paleozoic Ordovician Kanosh shale, Lehman Formation, Eureka quartzite, Devonian Guilmette limestone, Pennsylvanian Ely limestone, Permian Reipe Springs limestone, Ribhill sandstone, and Arcturus Formation near the location where the easement takes an abrupt turn to the south.

Segments 1E, 1F, 1G, 6A, 6B
The segments near Robinson Summit would be located in the southwestern portion of the Egan Range, and consist chiefly of Cenozoic Tertiary extrusive rhyolitic flows and shallow intrusive volcanic rocks with outcrops of Paleozoic Pennsylvanian Ely limestone, Permian Reipe Springs limestone, Ribhill sandstone, and Arcturus Formation.

Segment 6C
From Robinson Summit, the transmission line would head south through Cenozoic Tertiary rhyolitic flows and shallow intrusive volcanics and more Paleozoic Pennsylvanian Ely limestone, Permian Reipe Springs limestone, Ribhill sandstone, and Arcturus Formation. From here, the transmission line enters the Quaternary basin-fill deposits of eastern Jakes Valley. Jakes Valley

is 6 to 8 miles wide and 20 miles long, and is bordered by the Moorman Ridge of the White Pine Range to the west and the Egan Range to the east. The transmission line then skirts the western edge of the Egan Range and crosses Triassic volcanics and Pennsylvanian sediments before it heads back up into the Egan Range through Paleozoic Pennsylvanian Ely limestone, Permian Reipe Springs limestone, Ribhill sandstone, and Arcturus Formation.

Briefly, the transmission line crosses Quaternary basin-fill deposits of northern White River Valley before heading up into the flanks of the Egan Mountains. Here the transmission line crosses Cenozoic Tertiary volcanic deposits and Mississippian Pilot shale,. Joana limestone, Chainman shale, and a smaller outcrop of Devonian Guilmette limestone before heading down into the White River Valley.

The transmission line crosses into Nye County through Quaternary basin-fill deposits in the 70-mile long and 4- to 18-mile wide White River Valley. This valley is bordered by the White Pine and Grant Ranges to the west and the Egan and Schell Creek Ranges to the east. Here, the transmission line climbs the eastern flanks of the Grant Range for approximately 10 miles where Ordovician Lehman Formation limestone and Eureka quartzite, the Devonian Guilmette limestone, Mississippian Pilot shale, Joana limestone, Chainman shale, and minor Cenozoic Tertiary welded and non-welded silica ash-flow tuff volcanics are encountered. The line then drops back down into the Quaternary basin-fill of the White Pine Valley.

The transmission line then turns to the east, entering Lincoln County, where it climbs into the Schell Creek Range through Silver Creek Pass. Here, Cenozoic Tertiary volcanics consisting of andesites, basalts, and welded and non-welded silica ash-flow tuffs are crossed in addition to the Ordovician Lehman Formation limestone and Eureka quartzite, undifferentiated Ordovician dolomites and limestones, Silurian Laketown dolomite, Devonian Guilmette limestone, Mississippian Pilot shale, Joana limestone, and Chainman shale.

Segment 8

The segment traverses Quaternary basin-fill deposits and Cenozoic Tertiary welded and non-welded silica ash-flow tuffs of the Dry Lake Valley. This valley is 40 miles long and 4 to 12 miles wide, and is bordered by the Schell Creek and North Pahroc Ranges to the west and the Schell Creek, West, Bristol, Highland, Chief Ranges, and Delamar Mountains to the east. The transmission line then passes into the Delamar Valley, which is 45 miles long and 4 to 11 miles wide, where Quaternary basin-fill deposits are crossed. The valley is bordered to the west by South Pahroc Range and, to the east, by the Delamar Mountains. The South Pahroc Range is composed entirely of Cenozoic Tertiary welded and non-welded ash-flow tuffs.

Segment 9B

This segment crosses Quaternary alluvium and Quaternary lake bed, playa, and alluvial flats deposits in Delamar Valley, and is bordered to the west by the South Pahroc Range and, to the east, by the Delamar Mountains.

Segment 9A

This section of the transmission line rises out of the Quaternary basin-fill deposits of Delamar Valley and crosses the southern portion of the Delamar Mountains where Cenozoic Tertiary welded and non-welded ash-flow tuffs and andesites are crossed.

Segment 9C

The transmission line segment starts in Quaternary basin-fill deposits of Delamar Valley before rising out of the valley and crossing the southwestern portion of the Delamar Mountains. Here, Cenozoic Tertiary volcanics consisting of andesites and welded and non-welded silica ash-flow tuffs are traversed.

Segment 9D
Where this transmission line segment descends the southern flanks of the Delamar Mountains, Cenozoic Tertiary volcanics, consisting of andesites and welded and non-welded silica ash-flow tuffs, are encountered including a small deposit of Quaternary basin-fill deposits before the line heads into Coyote Springs Valley.

Segment 10
This segment heads southeast through southern Dry Lake Valley, crossing Quaternary alluvium before the line heads up into the Delamar Mountains consisting of Cenozoic Tertiary welded and non-welded silica ash-flow tuffs. The line then heads south down through Boulder Canyon, crossing Cenozoic Tertiary rhyolitic intrusives and basaltic flows, and Quaternary alluvial valley deposits. The line then heads southwest into Kane Springs Wash where Quaternary alluvial valley deposits and a minor outcrop of Ordovician Lehman Formation limestone, Kanosh shale, and Eureka quartzite are crossed.

Segment 11
Coyote Springs Valley, in the vicinity of the transmission line, contains Cenozoic Quaternary valley-fill alluvium and Tertiary tuffaceous sedimentary deposits. This valley is bounded by the Sheep Creek Range to the west and the Meadow Valley Mountains and Arrow Canyon Range to the east. The segment continues south through the Quaternary basin-fill deposits until the transmission line starts up the western flanks of the Arrow Canyon Range where the Paleozoic Devonian Guilmette limestone and Mississippian Monte Cristo limestone are crossed. The transmission line then abruptly turns to the east and crosses the Arrow Springs Range encountering Mississippian Monte Cristo limestone, and Pennsylvanian Bird Spring Formation before heading south down the eastern flank of the range, and entering the Quaternary valley-fill deposits in Dry Lake Valley.

3.3.4.3 Water Supply Facilities

All of the water supply alternatives are located in Steptoe Valley except for the Duck Creek Impoundment Water Supply. The Cherry Creek Mountains and Egan Range are located to the west and the Schell Creek Range is to the east. Duck Creek is a Quaternary basin-filled valley surrounded by the Schell Creek Range.

3.3.4.4 Rail Facilities

The Alternative Rail Line starts at Shafter in the Goshute Valley of Elko County, which is 70 miles long and 6 to 12 miles wide. The valley is composed of Quaternary basin-fill deposits. The line then crosses into White Pine County and enters the basin-fill deposits of Steptoe Valley.

3.4 Paleontological Resources

Paleontological resources are fossilized remains of past life including invertebrate and vertebrate animals and multi-cellular plants, including imprints. These resources are non-renewable and therefore are considered sensitive. Due to their paucity, fossils are important records of ancient life, particularly vertebrate fossils. Federal requirements for protection of paleontological resources include the 1906 Federal Antiquities Act, Historical Sites Act of 1935, the Federal Land Policy and Management Act of 1976, and BLM Paleontology Resources Management Manual and Handbook H-8270-1 (revised 1998). Unauthorized collection or removal of vertebrate, rare invertebrate, and rare plant fossils from federal land is illegal.

3.4.1 Area of Analysis

The proposed project disturbance areas, including the plant sites, electric transmission corridors, transportation corridors, and water supply facilities, are included in the area of analysis. A project-specific paleontological resources assessment was conducted (Reynolds 2007) for the project components. Portions of the electric transmission corridors that were covered in the SWIP Corridor EIS (BLM 1993) were assessed in a previous report (SBCM 2006). Construction excavation associated with the plant sites and utility corridors has the potential to reach subsurface sediments that have the potential of containing significant, nonrenewable paleontological resources.

3.4.2 Data Sources and Methods

Paleontological resource data was collected through literature searches and field inspection (Reynolds 2007 and SBCM 2006).

For the purposes of the paleontological study, sediments are characterized by their potential to contain significant paleontological resources. Sedimentary units that are characterized as sensitive are those with a high potential for containing significant paleontologic resources, in other words, geologic units within which vertebrate fossils or significant invertebrate fossils have been determined by previous studies to be present or likely to be present. These characterizations can extend anywhere within the sedimentary unit's geographical extent and to units that are suitable for preservation of fossils. The following designations were used (Reynolds 2007 and SBCM 2006):

- High paleontological sensitivity at surface exposures (High at Surface)
- High paleontological sensitivity 5 feet below surface (High below Surface)
- Low paleontological sensitivity at surface exposures (Low at Surface)
- Low paleontological sensitivity 5 feet below surface (Low below Surface)
- Undetermined paleontological sensitivity

3.4.3 Existing Conditions

Fossils are abundant in the Basin and Range geologic province. The Paleozoic Era, ranging from 235 to 550 million years ago, includes seven periods beginning with the Cambrian Period (480 to 550 million years ago) with abundant fossil olenelloid trilobites. Fish, the earliest fossil vertebrates, are known to occur in Nevada in sedimentary rocks of Silurian Age from about 390 to 415 million years ago (Carroll 1987). Many later Paleozoic limestones and shales have produced diverse invertebrate faunas containing sponges, corals, stromatoporid structures, brachiopods, gastropods, pelecypods, cephalopods, crinoids, and echinoderm spines. The Permian Kaibab limestone, dating from about 235 to 275 million years ago, is easily recognized by the large, dome-shaped, productid brachiopod fossils that it contains.

Mesozoic Era (about 60 to 235 million years ago) deposits began with Triassic limestones and siltstones. Marine limestones often contain fossil pelecypods, gastropods, and corals. Late Triassic sediments at Ichthyosaur State Park (Austin, Nevada) contain dolphin-shaped marine reptiles. Jurassic sandstones in southern Nevada contain tracks of bipedal dinosaurs, mammal-like reptiles, and flying reptiles—the pterosaurs (Reynolds and Weasma 2002; Reynolds 2006a; Reynolds and Mickelson 2006). Dinosaurs have recently been discovered in Cretaceous sediments in Clark County (Bonde et al. 2006).

The Cenozoic Era (present to about 60 million years ago) is the age of mammals, and Nevada contains a long record of unusual fossil mammals. The Elderberry Creek Fauna south of Ely is a very diverse Eocene fauna containing 30 species of mammals and 10 species of lower vertebrates (Emry and Korth 1989; Emry 1990). Middle Miocene deposits of volcaniclastic sediments containing Barstovian and Clarendonian Land Mammal Age faunas are recognized from White Pine County. Late Miocene and early Pliocene Hemphillian and Blancan Land Mammal Age sediments with abundant vertebrate fossils are known from the Caliente area of Lincoln County. Late Miocene Hemphillian Land Mammal Age trackways are known from the Muddy Creek Formation in eastern Clark County (Reynolds 2006b). These red sandstones are overlain by early Pliocene Blancan Land Mammal Age sediments with abundant vertebrate fossils (Reynolds and Lindsay 1999).

Pleistocene fossils from the late Cenozoic Era are found in valley bottoms and in caves developed in limestones on high mountains (Austin et al. 2005; Bell 1990, 1993, 1995; Emslie and Czaplewski 1985; Mead 1988; Mead and Bell 1996; Palevich 2002; Wormington and Ellis 1967). The White Pine Public Museum contains a fossil horse tibia from the Pleistocene deposits in Spring Valley located east of Steptoe Valley.

3.4.4 Specific Project Area Conditions

3.4.4.1 Plant Sites

The South Plant Site has a surface expression of thin fanglomeratic debris (conglomerate formed on alluvial fan) from the east to the middle of the site. The western portion of the site becomes silty sands indicating Pleistocene alluvial fan gravels have been deflated to a flat pavemented surface. The site is situated on Quaternary (dating from about 2 million years ago to present) sediments. A sedimentary cross-section southwest of the site indicates Holocene and Pleistocene deposits with a high potential for fossils beginning at about 9.5 feet below ground surface. The associated worker village is located to the north in the same sediments as the South Plant Site, about half with low paleontological sensitivity and half with high potential for fossils below ground surface. The Mt. Wheeler Transmission Line from the Gonder Substation to the South Plant Site would traverse sediments with low paleontological sensitivity, except where it intercepts the South Plant Site itself (discussed above).

The North Plant Site is similar with thin, deflated Pleistocene fanglomerate from the east to the middle of the site, becoming silts and silty sands on the west with Holocene dune sand on the very west portion. A sedimentary cross-section to the southwest of the site includes Holocene and Pleistocene deposits with a high potential for fossils at roughly 4.5 feet below ground surface. The sediments at the associated worker village to the north are similar to the North Plant Site. The Mt. Wheeler Transmission Line from Gonder Substation to the North Plant Site traverses mostly sediments with low paleontological sensitivity.

At both Plant sites, the fine-grained Pleistocene sediments with potential to contain fossil Ice Age vertebrates have a paleontological sensitivity designation of “High below Surface.”

3.4.4.2 Electric Transmission Facilities

Information regarding paleontological sensitivities along the applicable segments of the SWIP Corridor (BLM 1993; SBCM 2006), from approximately the east side of Egan Range to Delamar Valley (Segments 1D, 6C, and 8), is minimal and general as it was assessed from a literature review without field inspection. These were not included in the Project specific assessment (Reynolds 2007) since they were included in analysis of the SWIP Corridor EIS (BLM 1993). The valley floors and bases of the mountain ranges are composed of Quaternary alluvial

deposits that generally have a low potential for paleontological resources (Stewart 1980). Small areas with lacustrine (lake bed) sediments are also located in valley bottoms; these have high paleontological potential (Dames & Moore 1983). Invertebrate fossils—including brachiopods, corals, and mollusks—are found in Nye County along the SWIP Corridor (BLM 1993). Tertiary sedimentary rock with a high paleontological sensitivity is present north of Robinson Summit. Further, younger tertiary sedimentary rocks are present in a few small areas south of Robinson Summit and near Ellison Creek west of Preston, which are of high paleontological sensitivity.

Reynolds (2007) conducted a paleontological study of certain segments of the proposed electric transmission corridors. According to the SBCM report (2006) for the SWIP Corridor, no significant paleontologic resource localities are recorded within the SWIP Corridor. These findings are presented below.

Segment 1A

Segment 1A crosses coarse sediments assigned a paleontological sensitivity of "Low at Surface."

Segments 1B and 1C

The portion of Segment 1B between the North Plant Site and the NNRy crosses mid-valley fine-grained Pleistocene sediments with potential to contain fossil Ice Age vertebrates approximately 5 feet below the surface. These sediments have a paleontological sensitivity designation of "High below Surface." The lower portion of Segment 1B and Segment 1C along the Egan Range cross coarse alluvial fans with "Low at Surface" paleontological sensitivity.

Segment 1D

This segment was not included in the site specific study as it was part of the SWIP Corridor EIS (BLM 1993). The SBCM report (2006) indicates a small area of high paleontological sensitivity in the middle of the segment and the remaining southern portion has undetermined paleontological sensitivity.

Segment 1E and 1F

This location is characterized by a thin veneer of late Tertiary gravels that overlies middle Miocene volcaniclastic sediments. Such sediments are reported to contain middle Miocene Barstovian North American Land Mammal Age mammals at Ellison Creek to the west, Butte Range to the north, and southern Schell Creek Range to the southeast. These Miocene sandstones have been designated with "High at Surface" paleontological sensitivity.

Segment 3

The portion of Segment 3 from the South Plant Site to the area west of the NNRy and then south to the east slopes of Egan Range crosses mid-valley, fine-grained Pleistocene sediments with potential to contain fossil Ice Age vertebrates approximately 5 feet below the surface. These sediments have a paleontological sensitivity designation of "High below Surface."

Along the alluvial slopes on the east side of the Egan Range above an elevation of 5,700 feet amsl, Segment 3 crosses coarse sediments assigned a paleontological sensitivity designation of "Low at Surface."

Segment 4A

Segment 4A crosses coarse alluvial fans from the Egan Range with "Low at Surface" paleontological sensitivity.

Segment 6A and 6B

This location is characterized by a thin veneer of late Tertiary gravels that overlies middle Miocene volcaniclastic sediments. Such sediments are reported to contain middle Miocene

Barstovian North American Land Mammal Age mammals at Ellison Creek to the west, Butte Range to the north, and southern Schell Creek Range to the southeast. These Miocene sandstones have been designated with "High at Surface" paleontological sensitivity.

Segment 6C

This segment was not included in the site specific study as it was part of the SWIP Corridor EIS (BLM 1993). The SBCM report (2006) indicates that the majority of this segment has low paleontological sensitivity with areas of undetermined sensitivity in the northern half, an area of high sensitivity in the middle, and an area of high sensitivity in the southern portion where the segment veers east.

Segment 8

This segment was not included in the site-specific study as it was part of the SWIP Corridor EIS (BLM 1993). The SBCM report (2006) indicates that the northern third of this segment has high paleontological sensitivity with areas of undertermined sensitivity in the middle and the southern end.

Segment 9

Segment 9B and part of Segment 9A cross playa silts and sandy siltstones of Delamar Playa. The Pleistocene lake at this locality (Snyder et al. 1964) may have been larger than the current playa. In Holocene time, alluvial sediments covered the margins of the Pleistocene lake. For this reason, the perimeter of the playa has a "High at Surface" designation. Southwest of Delamar Valley, Segments 9A, 9C, and 9D cross non-fossiliferous Miocene volcanic flows and ignimbrites and non-fossiliferous alluvium in drainages.

Segment 10

Segment 10 contacts the Pliocene sediments north and south of US-93 at the junction with Kane Spring Valley Road, and for approximately 3 miles east of US-93. This section of the segment has a paleontological sensitivity designation of "High below Surface."

Robinson Summit Substation

The Robinson Summit Substation is located near the crest of Egan Range. This location is characterized by a thin veneer of late Tertiary gravels that overlies middle Miocene volcaniclastic sediments. Such sediments are reported to contain middle Miocene Barstovian North American Land Mammal Age mammals at Ellison Creek to the west, Butte Range to the north, and southern Schell Creek Range to the southeast. These Miocene sandstones have been designated with "High at Surface" paleontological sensitivity.

Harry Allen Substation

The Harry Allen Substation is at the southwest end of Dry Lake Valley. Dry Lake Valley contains a playa below 1,980 feet, and may have contained an Ice Age Lake that filled the basin to an elevation of 2,000 feet. The proposed expansion site is at 2,160 feet amsl on a thick section of gravels derived from Paleozoic carbonate rocks from the Arrow Canyon Range to the west. The Pleistocene gravels have "Low at Surface" paleontological sensitivity.

3.4.4.3 Water Supply Facilities

Lages Station Well Field and Water Line

The Lages Station Water Line heads south from Lages Station east of Goshute Lake, to the North Plant Site. The Lages Station Well Field and the entire northern portion of the alignment lies within Pleistocene sediments exposed at shallow depth below a shallow cover of deflated Holocene alluvium. The Pleistocene silts and sandy siltstones have a paleontological sensitivity

designation of "High at Surface," and are generally covered by no more than 2 feet of Holocene sediments.

The portion of the Lages Water Line from the North Plant Site south along US-93 would be in fanglomeratic sediments with low potential to contain significant vertebrate fossils, and have a paleontological sensitivity designation of "Low at Surface." From the area where it diverges to the west from US-93 south to the South Plant Site, the water line traverses through fine-grained sediments with potential to contain significant vertebrate fossils. These fine grained Pleistocene sediments have the potential to contain fossil Ice Age vertebrates approximately 5 feet below the surface and, therefore, have a paleontological sensitivity designation of "High below Surface."

Coyote Valley Ranch Well Field
This area is partially located within fine-grained sediments with potential to contain significant vertebrate fossils. These fine grained Pleistocene sediments have the potential to contain fossil Ice Age vertebrates approximately 5 feet below the surface and therefore have a paleontological sensitivity designation of "High below Surface."

North Well Field
The North Well field is within Pleistocene sediments exposed at shallow depth below a shallow cover of deflated Holocene alluvium. The Pleistocene silts and sandy siltstones have a paleontological sensitivity designation of "High at Surface," and are generally covered by no more than 2 feet of Holocene sediments.

Middle Well Field
The Middle Well Field would be in fanglomeratic sediments with low potential to contain significant vertebrate fossils; thus, a paleontological sensitivity designation of "Low at Surface."

South Well Field and Limited South Well Field
These well field Alternatives are partially located within fine-grained sediments with potential to contain significant vertebrate fossils. These fine-grained Pleistocene sediments have the potential to contain fossil Ice Age vertebrates approximately 5 feet below the surface and, therefore, have a paleontological sensitivity designation of "High below Surface."

Duck Creek Water Line
The Duck Creek Water Line runs parallel to Duck Creek in the northeastern Duck Creek Range, then west, parallel to SR-486 to the South Plant Site. The line runs westerly in the Holocene fanglomerate of the canyon bottom. The portion of this water line, from its point of inception to US-93, is within coarse Pleistocene gravels that have "Low at Surface" paleontological sensitivity.

3.4.4.4 Rail Facilities

South Plant Site Rail Lead
West of the South Plant Site, the rail lead crosses buried fine-grained Pleistocene sediments with a paleontological sensitivity designation of "High below Surface." Holocene and Pleistocene deposits that occur in this area have a high potential for fossils beginning at about 9.5 feet below ground surface.

North Plant Site Rail Lead
In areas on the west side of Steptoe Valley, the rail lead to the North Plant Site contacts sediments with a paleontological sensitivity designation of "High below Surface." The rail lead would cut through gray lacustrine sediments of Pleistocene Lake Steptoe that sit at elevations

above the surface of Goshute Lake (Snyder et al. 1964). These sediments have a paleontological sensitivity designation of "High at Surface."

Alternative Rail Line

The Alternative Rail Line starts at Shafter and stays east of the existing NNRy, contacting Pleistocene Lake Goshute sediments in Goshute Valley before reaching the Currie Hills. These sediments have a paleontological sensitivity designation of "High at Surface." In the Currie Hills, 2.5 miles east of Currie, the new rail line would probably cut through Triassic marine limestones and Jurassic sandstone, as well as Miocene volcaniclastic sediments. These sediments have a paleontological sensitivity designation of "High at Surface." South of Currie Hills, the alternative rail line contacts gray lacustrine sediments of Pleistocene Lake Steptoe that sit at elevations above the surface of Goshute Lake (Snyder et al. 1964). These sediments have a paleontological sensitivity designation of "High at Surface." The section of rail to the North Plant Site would contact fine-grained Pleistocene sediments at and below the ground surface (Snyder et al. 1964). These sediments have paleontological sensitivities of "High at Surface" and "High below Surface."

3.5 Soils

3.5.1 Area of Analysis

The proposed general project area is shown in **Figure 1.1-1** and includes the east central portion of Nevada, specifically Steptoe Valley of White Pine County, with linear elements of the Project extending north into Elko County and south through Nye and Lincoln Counties to terminate in Clark County, Nevada. The area of analysis was defined as the potential disturbance footprint of any of the components of the Proposed Action or Action Alternatives being carried forward for full analysis. In addition, a variable corridor width, ranging between 600 to 2,800 feet wide depending upon the Project component (i.e., water line, transmission line, rail leads, etc.) was also evaluated.

3.5.2 Data Sources and Methods

As described in **Section 1.13.2**, issues and indicators were developed by resource to assist in focusing the data collection on existing conditions in the area of analysis and to aide in the impact analysis for Chapter 4. Indicators for soils focused on acreage of soil disturbance, acres to be reclaimed, and suitability of potentially disturbed soils for reclamation purposes.

Available data from the Natural Resource Conservation Service (NRCS) and other scientific or governmental sources were utilized to obtain information for this section. The Official Soil Series Descriptions website (USDA 2007a) is the main reference for determining soil characteristics. Procedures and interpretations were adapted primarily from revised Internet versions of the *Soil Survey Manual* (USDA 2003) and the *National Soil Survey Handbook* (USDA 2005).

3.5.3 Existing Conditions

Soil Map Unit Descriptions

Soils are shown at a 3rd Order level throughout the majority of the project area; although, some areas of Nevada have not been surveyed and do not have soil mapping information. Soil map units consist of associations and consociations of individual soil series. Hundreds of individual soil map units have been identified within the corridors and facilities of the project area. Typical soil map units identified in the concentrated areas of proposed disturbance within the Steptoe Valley portion of the project area are shown on **Figure 3.5-1**.

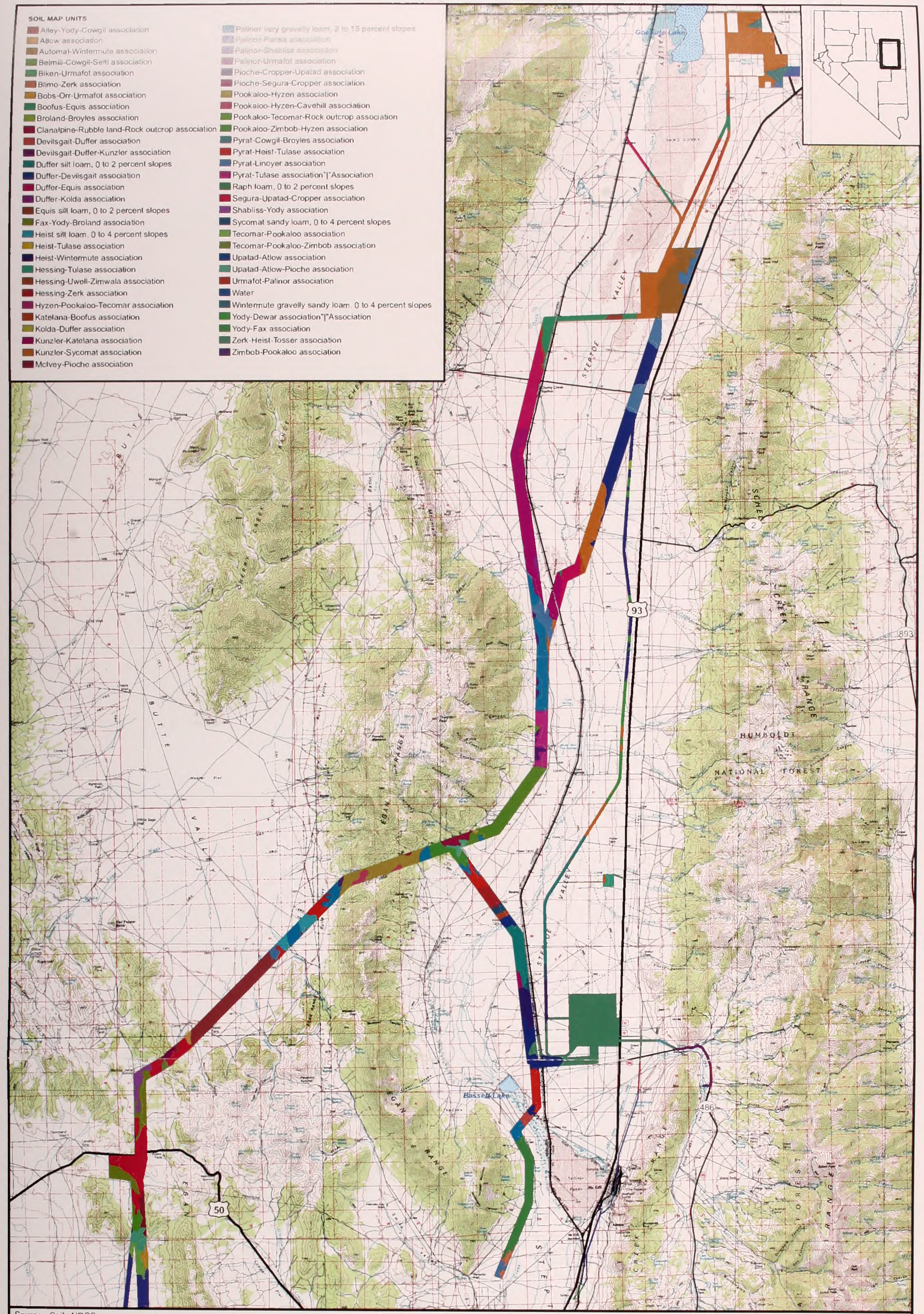


FIGURE 3.5-1
SOIL MAP UNITS IN THE STEPTOE VALLEY
ELY ENERGY CENTER

Map units are identified by land types and cover a wide range of topography within the project area—from valley and drainage bottoms to canyon slopes, sideslopes, and ridgetops. Soils found on basin floors typically range from fine-grained to moderately coarse textures, and show little profile development. Accumulations of soluble salts or silica may occur at depth. Fan piedmonts can be shallow to very deep and range from moderately fine to moderately coarse or gravelly texture. Silica and lime cementation may be present in some of these soils. Soils found on mountain slopes contain gravel and coarse-textured material and are typically underlain by bedrock at shallow depths. Soils on hills and mountains may be at risk for erosion, especially on steeper slopes. Fine to coarse textured soils are found on the moderate slopes of alluvial fans and stream terraces. Soils in these settings are associated with high water tables and occasionally can be flooded (BLM 2008a).

Soils are strongly influenced by the type of bedrock geology (BLM 2008a). Parent materials for soils within the project area consist of mixed rock materials, including sandstone, dolomite, limestone, chert, volcanic rocks, and lacustrine deposits, formed from loess, colluvium, alluvium and residuum (USDA 2007a). Soil in drainages and swales developed primarily from alluvial materials, loess is derived from windblown soil. Colluvium is the parent material for development of soil on most slopes.

The majority of soil resources in the project area are classified as very deep, well-drained soils. Soil textures are generally loamy with a high percentage of coarse fragments. Representative slope steepness ranges from 1 to 53 percent, and varies depending on the profile location. Soil depths in the project area range from rock outcrop areas with no measurable soil to profiles greater than 5 feet thick. Deeper portions of the soil profile generally contain a high percentage of coarse fragments, with the high average ranging from 35 to 65 percent pebbles and cobbles (USDA 2007a).

3.5.3.1 Prime Farmland

Prime farmland is classified as available land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops (USDA 2003). Prime soils have the quality, growing season, and moisture supply needed to produce economical crops, including few or no rocks. NRCS data indicates the majority of soil map units within the project area are not suitable for classification as prime farmland (USDA 2007b). Few soils within the project area have been classified as prime farmland soils, and only on the condition that the soil is irrigated and the soil erodibility and climate factors are within certain limits (USDA 2007b). The Kunzler-Sycomat soil is classified as a prime farmland soil with the addition of irrigation. No soils in the project area are classified as prime farmland without the addition of these conditions.

3.5.3.2 Growth Medium

Excessive coarse fragment content is the limitation that has the most potential to negatively influence fertility and production of reclaimed areas within the project area. **Table 3.5-1** identifies the criteria used to determine suitability of soils for use as growth medium during reclamation.

Typical texture of map units within the project area consists of loamy soils, often with coarse fragment modifiers. The presence of fine-textured loams indicates that these soils would have a fair rating for use as growth medium during reclamation.

Map units have been identified as having from 0 to more than 35 percent surface coarse fragments with some profile layers containing as much as 80 percent coarse fragments (USDA

2007a). Greater than 35 percent coarse fragment content in the top 40 inches of the soil profile indicates that the material is unsuitable for growth medium (USDA 2003). In contrast, it has been determined that adjacent soils in these same areas contain fine textured materials in the upper 60 inches of the profile (USDA 2007a) and possibly to greater depths. Mixing of suitable and unsuitable soils would dilute the negative effects of excessive coarse fragment content yielding a poor or fair growth medium suitability rating.

Few map units in the project area have been identified as being hydric (USDA 2007b), and rare isolated soils in this area have a shallow depth to the high water table (USDA 2007a), indicating that the remaining soils would be classified as good to fair for use as growth medium.

TABLE 3.5-1. CRITERIA USED TO DETERMINE GROWTH MEDIUM SUITABILITY

PROPERTY	TOPSOIL/GROWTH MEDIUM SUITABILITY				RESTRICTIVE FEATURE[1]
	GOOD	FAIR	POOR	UNSUITABLE	
Texture	textures finer than sands and coarser than sandy clay and silty clay, with less than 35% clay	loamy textures	sand textures and clayey textures with <60% clay	>60% clay content	excessive sands or clays
Organic Matter Content	>3%	<3% but greater than 1%[1]	0.5 to 1.0%[1]	<0.5%[1]	low fertility
Coarse Fragments (0-40 inches)	<15% by volume	15-25% by volume	25-35% by volume	>35%	equipment restrictions and low fertility
Depth to High Water Table	--	--	<1 foot to high water	perennial wetness	equipment restrictions
Soil Reaction – pH[2] (0-40 inches)	6.0 to 8.0	5.0 to 6.0 8.0 to 8.5	4.5 to 5.0 8.5 to 9.0	<4.5 or >9.0	excessive acidity or alkalinity
Slope Steepness	<8% slope	8 to 25% slope	25 to 40% slope	>40% slope	equipment restrictions

Source: (USDA 2003, USDA 2005)
[1] As defined in the Soil Survey Manual (USDA 2003) and National Soil Survey Handbook (USDA 2005).
[2] pH in standard units.

Soil reaction indicates the potential for excessive acidity or alkalinity in the soil. The soils within the project area are generally neutral to alkaline with pH values ranging from 6.8 to 9.4 (USDA 2007a). The majority of map units have pH values of 7.8 to 8.4, indicating a good to fair rating for use as growth medium.

NRCS data describes the possible range of slope steepness of the mapped soils from 0 percent to over 50 percent (USDA 2007b), indicating that some soils would be poor or unsuitable for use as growth medium. Maps of the project area show that the actual locations of the plant sites and most of the linear corridor features would occur in areas that are considerably flatter than the extremely steep slopes within the range of general characteristics of some mapped soils.

The depth of growth medium needed for reclamation is dependent on the characteristics of the material to be covered and the effectiveness of the bond between the base material and the applied growth medium. A 6-inch depth of loose topsoil will settle an inch or two; therefore, 3 to 6 inches after settling is sufficient with adequate irrigation to establish grasses and legumes (State of Nevada 1994). **Table 3.5-2** shows the volume of material required to obtain various depths of growth medium applied during reclamation activities.

Rock outcrops are not suitable for recovery and use as growth medium. Based on review of available soil data, most recovered soil material would be classified as good, fair, or poor for use as growth medium during reclamation activities. Mixing of soil map units during salvage operations would dilute excessive coarse fragment content and distribute organic matter throughout the recovered material, resulting in maximum recovery volumes.

TABLE 3.5-2. MATERIAL VOLUME FOR APPLICATION OF GROWTH MEDIUM TO VARIOUS DEPTHS

DESIRED DEPTH OF GROWTH MEDIUM APPLICATION (INCHES)	CUBIC YARDS PER 1,000 SQUARE FEET REQUIRED	CUBIC YARDS PER ACRE REQUIRED
1	3.1	134.4
2	6.2	268.9
3	9.3	403.3
4	12.4	537.8
5	15.5	672.2
6	18.6	806.7

Source: State of Nevada 1994

3.5.3.3 Erosion Potential

The overall hazard of erosion for soils has previously been determined by soil surveys conducted within the project area (USDA 2007a). In general, upland areas are more susceptible to erosion than lowland sites, and areas with higher coarse fragment content and lower slope angle have lower potential for water erosion hazard. Areas where herbaceous vegetation is sparse or absent are most susceptible to wind and water erosion, and to drying and crusting (BLM 2008a, USDA 2007c).

Living organisms and their byproducts form biological crusts at the surface of the soil by binding soil particles together with organic materials (BLM 2008a). The ecological function of these crusts is to stabilize the soil, increase water infiltration, and enhance plant establishment. Trampling by livestock, wild horses or wildlife, increasing recreational use, and severe wildfires affect the biological crusts and, although they tolerate harsh growing conditions, biological crusts are not well adapted to physical disturbances (BLM 2008a). The potential for soil erosion increases when the crusts are diminished (BLM 2008a).

The K factor is an empirical measure of soil erodibility as affected by intrinsic soil properties, representing the combination of detachability of the soil, runoff potential of the soil, and the transportability of the sediment eroded from the soil. The main soil properties affecting K values are soil texture, organic matter, structure, and runoff potential as related to permeability of the soil profile. In general terms, high clay soils have low K values because these soils are resistant to detachment. High sand soils have low K values because these soils have high infiltration rates and reduced runoff, and sediment eroded from these soils is not easily transported. Silt loam soils have moderate to high K values because soil particles are moderately to easily detached, infiltration is moderate to low, producing moderate to high runoff, and the sediment is moderate to easily transported. Silt soils have the highest K values because these soils readily crust, producing high runoff. Also, soil particles from silt soils are easily detached, and the sediment is easily transported (USDA 2007c). General review of soil textures within the project area shows a predominance of silt loam and loamy soils, many with coarse fragment modifiers, indicating a range of moderate to high erosion potential ratings utilizing this method of erosion determination. A high percentage of coarse fragments and/or dense vegetation on the soil surface would further reduce the erosion potential by wind and water. Mean annual precipitation in the project area ranges from 7 to 14 inches (see **Table 3.6-2**), with a mean annual

temperature range of 40 to 50 degrees Fahrenheit (USDA 2007a). Throughout most of the area, the majority of precipitation occurs during the winter as snow. The moisture regime for most soils has been classified as aridic with some areas determined to be borderline xeric, such as the Heist soil which is dry 55 to 70 percent of the time when the temperature is above 41 degrees Fahrenheit (USDA 2007a). Typical soils in the eastern half of Nevada are dry from June through October, or are dry for 70 to 80 days after June 21 (USDA 2007a).

Erosion potential increases with slope steepness, and is affected by slope length and shape. Soil erosion increases more rapidly with slope steepness than with slope length. Rill erosion increases in a downslope direction because runoff, which is the primary erosive agent for rill erosion, increases in a downslope direction. Interrill erosion is primarlily caused by raindrop impact and does not vary with location on the slope. Erosion is greatest on convex slopes that are steep near the end of the slope length where runoff is greatest. Erosion is least for concave slopes where the upper end of the slope is steep and runoff is least. Deposition occurs on concave slopes where transport capacity of the runoff is reduced as the slope flattens (USDA 2007c).

Soil permeability is the quality of the soil that enables water or air to move through it. The soil properties that affect permeability are distribution of pore sizes and pore shapes. Texture, structure, pore size, and density are properties used to estimate permeability since the pore geometry of a soil is not readily observable or measurable (USDA 2003). Soils with moderate or moderately rapid permeability characteristically tend to reduce surface water erosion potential.

Drainage class identifies the natural drainage condition of the soil. It refers to the frequency and duration of wet periods (USDA 2003; USDA 2005). Soils in the project area are generally well drained (USDA 2007a), which indicates that water is removed from the soil readily and sometimes rapidly. A minority of soils have been classified as somewhat poorly drained or very poorly drained (USDA 2007a). Therefore, wetness is not a factor that would inhibit growth of roots for significant periods during most growing seasons (USDA 2003).

Soil loss tolerance (T-factor) is defined as the maximum rate of annual soil erosion at which the quality of a soil as a medium for plant growth can be maintained (USDA 2005). The T-factor is represented by integer values ranging from 1 to 5 tons per acre per year (USDA 2003). The factor of 1 ton per acre per year (tons/acre/yr) is for shallow or otherwise fragile soils, and 5 tons/acre/yr is for deep soils that are least subject to damage by erosion (USDA 2003). Loss of only 1/32 of an inch can represent a 5-ton per acre soil loss (USDA 1996). A T-factor rating is assigned to soils without respect to land use or cover and represents the soil loss from wind and water erosion. Select published data on rates of soil formation and plant productivity responses to erosion indicate that tolerable soil losses vary widely for croplands (DeBano and Wood 1992). Data for rangelands are essentially nonexistent, although values of 4.5 tons/acre/yr have been estimated for shallow soils on rangeland sites (DeBano and Wood 1992).

Elliot et al. (1996) determined that soil erosion in an undisturbed forest is extremely low, generally under 0.5 tons/acre/yr. Disturbances can dramatically increase soil erosion to levels exceeding 50 tons/acre/yr. These disturbances may include natural events such as wildfires and mass movements, as well as human induced disturbances such as road construction and timber harvesting.

Studies conducted in the BLM Ely District indicate that sediment yields from juniper and pinyon-juniper woodlands yielded 0.003 to 0.42 ton per acre of sediment, and sagebrush communities yielded 0.01 to 0.64 ton per acre (BLM 2008a). The highest infiltration rates and lowest sediment production were observed in the Steptoe watershed southeast of Ely, and the lowest

infiltration rates and highest sediment production were found in the Duckwater watershed southeast of Eureka (BLM 2008a). The least sediment yield numbers were found in big sagebrush and crested wheatgrass vegetation communities. Erosion and sediment yields within a watershed vary according to precipitation, soils, topography, and vegetation characteristics.

3.5.4 Specific Project Area Conditions

3.5.4.1 Plant Sites

Soil map units in the area of the proposed EEC Plant sites are shown at a 3rd Order level on **Figure 3.5-1**. **Table 3.5-3** identifies the areal extent of selected map units identified at the plant site disturbances. Soil textures at the South Plant Site range from fine sandy loam to extremely gravelly coarse sand with high coarse fragment content. Characteristic slope for selected soil map units ranges from 0 to 30 percent and typical land use is rangeland. Soil texture at the North Plant Site ranges from very gravelly loam to extremely stony silt loam and typical land use is rangeland or woodland.

TABLE 3.5-3. AREAL EXTENT OF SELECTED MAP UNITS LOCATED WITHIN PLANT SITE DISTURBANCE AREAS

PROJECT ELEMENT	MAP UNIT NUMBER / MAP UNIT NAME	ACRES
South Plant Site	160 – Zerk-Heist-Tosser association	2,970.3
North Plant Site	1120 – Kunzler-Sycomat association	1,135.8
	373 – Automal-Wintermute association	1,517.6
	189 – Pyrat-Linoyer association	316.0
Mt. Wheeler Transmission Line	286 – Palinor-Shabliss association	278.2
South Plant Worker Village	1120 – Kunzler-Sycomat association	474.5
North Plant Worker Village	1070 – Loray-Wintermute association	150.0

Source: USDA 2007b

The South Plant Site consists of the Zerk-Heist-Tosser map unit, an alluvial soil that is characteristically very deep and well drained with very slow to medium runoff. Zerk soil texture is extremely gravelly coarse sand with average rock fragment content of 60 to 80 percent, resulting in moderately rapid permeability in the upper part of the profile and rapid permeability in the lower part. Heist soils are fine sandy loams with very slow to medium runoff and moderately rapid permeability and soil moisture regime for this soil is aridic bordering on xeric. Tosser soils have very gravelly sandy loam texture with rock fragments ranging from 35 to 70 percent, yielding in slow runoff (USDA 2007a).

The North Plant Site consists of the Kunzler-Sycomat, Automal-Wintermute, and the Pyrat-Linoyer associations. Kunzler-Sycomat is located on the western side of the site and is a well-drained loam to gravelly sandy loam with a representative slope of 2 percent. This fine-textured map unit has a moderate infiltration rate when thoroughly wet, yielding a moderate runoff potential. Kunzler soils have loamy texture with low to medium runoff and moderately slow permeability and Sycomat soils have gravelly sandy loam texture with very low to medium runoff and moderate permeability (USDA 2007a). This map unit was formed from alluvium and comprises approximately 38 percent of the North Plant Site.

The Automal-Wintermute map unit consists of very deep, well-drained alluvial soils with high or very high runoff and slow permeability. These rangeland soils have a gravelly silt loam texture and slopes of 2 to 50 percent. Automal soils typically have approximately 35 percent pebbles at the soil surface and rock fragments from 40 to 80 percent throughout the remainder of the profile. Wintermute soils have an average rock fragment content of 35 to 60 percent, with

pebbles dominant (USDA 2007a). This map unit comprises about 51 percent of the North Plant Site located, approximately, through the center of the area.

The Pyrat-Linoyer map unit comprises approximately 10 percent of the North Plant Site and is located in the northeast portion of the area. Pyrat and Linoyer soils were formed from alluvium and are very deep, well-drained soils with low or moderate runoff potential, and moderate or very rapid permeability. Linoyer soil texture is very fine sandy loam or silt loam on slopes of 0 to 10 percent. Pyrat soils have a texture of very gravelly loam to very gravelly sandy loam. Slopes are 0 to 50 percent with an average precipitation of 8 to 12 inches (USDA 2007a).

The Palinor-Shabliss association is the major soil map unit within the Mt. Wheeler Transmission Line. These soils are shallow, well drained soils formed in alluvium. The soils have a duripan layer between 18 to 30 inches, with moderate permeability above the duripan. Surface runoff is very high and slopes range from 2 to 50 percent. Palinor soil is a very gravelly loam with typical coarse fragment content of 45 to 75 percent pebbles and 0 to 5 percent cobbles. Shablis soils consist of very fine sandy loam with an average rock fragment content of 0 to 25 percent, mainly pebbles (USDA 2007a).

The worker village associated with the South Plant Site consists of the Kunzler-Sycomat association, as described above.

The majority map unit in the worker village associated with the North Plant Site is the Loray--Wintermute association. Loray soils consist of very deep, somewhat excessively drained mixed alluvial soils with low to medium runoff and moderately rapid or moderate over very rapid permeability. These rangeland soils have a gravelly loam texture and slopes of 0 to 30 percent. The soil surface is partially covered with 50 percent pebbles. Wintermute soils are very deep, well-drained alluvial soils with high or very high runoff and slow permeability. Wintermute soils have gravelly silt loam texture, slopes of 0 to 15 percent, and an average rock fragment content of 35 to 60 percent, with pebbles dominant (USDA 2007a).

3.5.4.2 Electric Transmission Facilities

Corridors for the electric transmission lines would travel through areas of multiple soil map units. **Table 3.5-4** identifies soil map units that typify soils within the proposed boundaries of the electric transmission facilities and within the Robinson Summit Substation. Hundreds of individual soil map units have been identified along the transmission line project elements.

TABLE 3.5-4. AREAL EXTENT OF SELECTED MAP UNITS LOCATED WITHIN ELECTRIC TRANSMISSION FACILITY DISTURBANCE AREAS

PROJECT ELEMENT	MAP UNIT NUMBER / MAP UNIT NAME	ACRES
Segment 1B	421 – Wintermute gravelly sandy loam, 0% to 4% slopes	1,248.3
Segment 1B	491 – Kunzler-Katelana association	2,096.2
Segment 1D	361 – Belmill-Cowgil-Selti association	1,436.3
Segment 1D	1251 – Alley-Yody-Cowgil association	1,666.3
Segment 3	810 – Yody-Fax association	1,201.0
Segment 9D	1132 – Duffer silt loam, 0% to 2% slopes	736.6
Segment 6C	124 – Tecomar-Pookaloo association	1,476.0
Segment 8	1510 - Raph-Zimwala-Heist association	1,108.9
Segment 9B	1520 – Fax-Yody-Broland association	1,096.4
Segment 9D	AB – Arizo-Bluepoint association	622.0
Segment 10	1520 – Fax-Yody-Broland association	174.6
Segment 11	CTC – Colorock-Tonopah association	7,567.8
Robinson Summit Substation Area	760 – Segura-Upatad-Cropper association	738.5
	1520 – Fax-Yody-Broland association	289.6

Source: USDA 2007b

The transmission route includes the Wintermute gravelly sandy loam, a very deep, well drained soil formed in alluvium from limestone. Wintermute soils have high or very high surface runoff with slow permeability. Rock fragments average 35 to 60 percent with increasing pebbles and cobbles in the deeper portions of the profile (USDA 2007a).

The Kunzler-Katelana association soils are very deep, well drained alluvial soils. Kunzler soils are formed from tuffaceous sandstone and limestone and have loamy texture with low to medium runoff and moderately slow permeability. Katelana soils developed dominantly from limestone over lacustrine sediments, and have silt loam texture with low to medium runoff and moderately slow permeability (USDA 2007a).

Soils in the Belmill-Cowgil-Selti association are very deep, well drained soils that formed in alluvium. Belmill soils have a gravelly loam texture, Cowgil soils have very cobbly sandy loam texture, and Selti soils have very stony coarse sandy loam texture. Rock fragments typically comprise 40 to 60 percent of the profile. Belmill and Selti soils have medium runoff and moderate permeability. Cowgil soils have medium to very high runoff and moderately slow permeability (USDA 2007a).

The Alley-Yody-Cowgil association typically has medium to rapid runoff with moderately slow to moderate permeability. Alley soils are very deep, well drained soils formed in loess over alluvium and colluvium from andesite, basalt, and tuff. Soil texture is cobbly, fine sandy loam with up to 35 percent pebbles or cobbles. Yody soils are moderately deep, well drained gravelly sandy loams, and typically have a duripan layer located below 22 inches. Cowgil soils are very deep, well drained soils that have a very cobbly sandy loam texture with 40 to 60 percent coarse fragment content (USDA 2007a).

Duffer silt loam is found on 0 to 2 percent slopes and is a very deep, poorly, or somewhat poorly, drained soil with low to high surface runoff and moderately slow permeability. These soils are typically found on flood plains and have a seasonal high water table present between 1.5 to 3.5 feet (USDA 2007a).

Soils in the Tecomar-Pookaloo association are shallow, well drained soils that formed in residuum and colluvium derived from limestone and dolomite. Soil depth is typically less than 20 inches, underlain by fractured limestone. Tecomar texture is extremely stony silt loam with very high surface runoff and moderate permeability. The soil surface is partially covered with 25 percent pebbles and 15 percent cobbles and stones and these soils are found on mountains and hills with slopes of 8 to 50 percent. Pookaloo soil texture is very gravelly loam and the soil surface contains approximately 60 percent pebbles and 5 percent cobbles, yielding very high runoff and moderate permeability (USDA 2007a).

The Raph-Zimwala-Heist association consists of very deep, well drained to moderately well drained soils. Raph has a loam texture with low runoff and moderate permeability. Below 30 inches, rock fragment content increases up to 15 to 45 percent. Zimwala soils have a silt loam texture with slow runoff and slow to very slow permeability. Heist soils are fine, sandy loams with very slow to medium runoff and moderately rapid permeability (USDA 2007a).

Soils in the Yody-Fax and Fax-Yody-Broland associations are well drained soils that were formed in alluvium from dominantly volcanic rock sources. Descriptions of the individual soil series are described in **Section 3.5.4.2**.

The Arizo-Bluepoint association is a very deep, somewhat excessively drained soil group within an aridic moisture regime. Arizo soil texture is very gravelly fine sand with negligible to medium

runoff and rapid, to very rapid, permeability. Bluepoint soils are fine sands that have very low or low runoff and rapid permeability (USDA 2007a).

The Colorock-Tonopah association consists of alluvial soils that are deep and characteristically well drained with low to medium runoff and moderate to moderately rapid permeability. Colorock soils have a very gravelly clay loam texture with a hardpan at approximately 15 inches. Typical vegetation on these soils is stunted. Tonopah soils are very gravelly sandy loam with an average rock fragment content consisting of 40 to 65 percent pebbles and up to 25 percent cobbles (USDA 2007a).

The Robinson Summit Substation area consists of the Segura-Upatad-Cropper and Fax-Yody-Broland associations. These soils are shallow, well drained soils formed in residuum and colluvium from welded tuff, andesite, quartzite, conglomerate and rhyolite on mountains. Segura texture is very stony sandy clay loam on slopes of 4 to 50 percent with medium to very high runoff and moderate permeability. Typical soil profile is approximately 10 inches deep with rock fragment content of 10 to 35 percent. Upatad soils are very gravelly silt loams with 40 percent pebbles and 10 percent cobbles on the soil surface. Runoff is medium with moderately slow permeability. The Cropper soil has a very cobbly loam, extremely stony texture, and the soil surface is covered with 20 percent pebbles, 15 percent cobbles, and 5 percent stones. Cropper soils have very high surface runoff and moderately slow permeability (USDA 2007a).

The Fax-Yody-Broland association consists of well drained soils that were formed in alluvium from dominantly volcanic rock sources. Typical soil texture ranges from gravelly sandy loam, very gravelly loam to very gravelly coarse sandy loam. Yody and Fax soils are moderately deep, well drained soils and typically have a duripan layer located below 22 inches. Permeability is moderate to moderately slow with medium to high runoff. Broland soils are shallow to a strongly cemented duripan layer located between 19 to 40 inches below the soil surface. Runoff is medium to very high with moderately slow permeability (USDA 2007a).

3.5.4.3 Water Supply Facilities

Soil map units in the area of the proposed Water Supply Facilities are shown at a 3rd Order level on **Figure 3.5-1**. **Table 3.5-5** identifies the areal extent of selected map units within these components of the project area. The major soil map unit at the Lages Station Well Field and associated facilities is the Kunzler-Sycomat association as described in **Section 3.5.4.1**. This map unit was formed from alluvium, and comprises approximately 80 percent of the Lages Station Well Field area.

Other soils at this site are the Pyrat-Cowgil-Broyles and Pyrat-Linoyer associations. These map units are both well-drained, gravelly sandy loams with representative slopes of 5 percent. Pyrat and Linoyer soils have low or moderate runoff potential with moderate or very rapid permeability. Cowgil soils typically have very cobbly sandy loam texture with approximately 30 percent pebbles and 15 percent cobbles and stones at the surface, up to 70 percent coarse fragments throughout the profile, medium to very high runoff, and moderately slow permeability. Broyles soils consist of very fine sandy loam and similar textures throughout the profile that yields low runoff and moderately rapid or moderate permeability (USDA 2007a).

TABLE 3.5-5. AREAL EXTENT OF SELECTED MAP UNITS LOCATED WITHIN SELECTED WATER SUPPLY FACILITY DISTURBANCE AREAS

PROJECT ELEMENT	MAP UNIT NUMBER / MAP UNIT NAME	ACRES
Lages Station Well Field	1120 – Kunzler-Sycomat association	2,253.1
	181 – Pyrat-Cowgil-Broyles association	246.8
	189 – Pyrat-Linoyer association	36.0
Duck Creek Water Line	160 – Zerk-Heist-Tosser association	129.8
South Plant Water Supply Line	421 – Wintermute gravelly sandy loam, 0% to 4% slopes	727.3
North Plant Water Supply Line	1120 - Kunzler-Sycomat association	391.4

Source: USDA 2007b.

Map units present within the Duck Creek and North Plant water supply line routes include the Zerk-Heist-Tosser association and Kunzler-Sycomat association as described in **Section 3.5.4.1**. The South Plant water supply route includes the Wintermute gravelly sandy loam, as described in **Section 3.5.4.2**.

3.5.4.4 Rail Facilities

Corridors for the rail leads and the Alternative Rail Line would travel through areas of multiple soil map units. **Table 3.5-6** identifies soil map units that typify soils within the proposed boundaries of the rail facilities. Hundreds of individual soil map units have been identified along these linear project elements.

TABLE 3.5-6. AREAL EXTENT OF SELECTED MAP UNITS LOCATED WITHIN RAIL FACILITIES DISTURBANCE AREAS

PROJECT ELEMENT	MAP UNIT NUMBER / MAP UNIT NAME	ACRES
South Plant Site Rail Lead	160 – Zerk-Heist-Tosser association	97.8
	421 – Wintermute gravelly sandy loam, 0% to 4% slopes	38.1
Alternative Rail Line to South Plant Site	160 – Zerk-Heist-Tosser association	94.2
North Plant Site Rail Lead	1130 – Duffer-Equis association	115.3
	1270 – Boofuss-Equis association	102.3
Alternative Rail Line to North Plant Site	1190 – Katelana-Boofuss association	288.0
	1120 - Kunzler-Sycomat association	286.0

Source: USDA 2007b

Map units present within the rail facilities components include the Zerk-Heist-Tosser association, Kunzler-Sycomat association, and Wintermute gravelly sandy loam as described in previous sections. The Duffer-Equis, Katelana-Boofuss, and Boofuss-Equis associations are deep, to very deep, soils formed in alluvium on slopes of 0 to 2 percent. Duffer soils are poorly, or somewhat poorly, drained with low to high surface runoff and moderately slow permeability. Katelana soils are very well drained with low or medium runoff and moderately slow permeability. Boofuss and Equis soils are poorly drained with slow runoff and slow permeability. Soil texture for Duffer soils is silty clay loam, Katelana soil texture is silt loam, and Boofus and Equis soils have a silty clay texture. Duffer and Equis soils characteristically demonstrate the presence of a seasonal high water table from 1 to 5 feet (USDA 2007a).

3.6 Air Resources

3.6.1 Area of Analysis

For background, an analysis of the local and regional climate is documented. Climatic trends are discussed on that scale, and in a broad sense on a larger regional and national scale.

The air quality impact analysis includes a broad area around the proposed EEC plant site(s) in Steptoe Valley. Detailed analyses of impacts were prepared for Steptoe Valley and beyond for most air pollutants released above thresholds defined by the Nevada Division of Environmental Protection (NDEP) consistent with NDEP and EPA guidance.

In the vicinity of the Proposed Action, direct impacts are documented in and beyond the area where predicted air quality impacts reached air permitting significance thresholds for Class II areas,. Impacts on air quality and Air Quality Related Values (AQRVs) are also analyzed at all Class I areas within 300 kilometers of the proposed EEC plant site(s), and at federal land manager recommended sensitive Class II areas within 100 kilometers.

3.6.2 Data Sources and Methodology

The primary direct indicators of climate are the mean temperature, precipitation, and moisture levels. Indirect climatic indicators include the flora, fauna, and vegetation patterns that are naturally supported.

The primary indicator of air quality impacts will be the Nevada Ambient Air Quality Standards (AAQS), the EPA National Ambient Air Quality Standards (NAAQS), Prevention of Significant Deterioration (PSD) increment limits, PSD Significant Contribution Levels (SILs), and Air Quality Related Values (AQRVs). These ambient air quality standards are set for criteria air pollutants: nitrogen dioxide, sulfur dioxide, particulate matter, carbon monoxide, ozone, and lead, and enforced through air permitting requirements to protect public health. The primary regulated particulate has been PM_{10}, particulate matter 10 microns or less in diameter. Materials in this size range are considered inhalable because they generally pass into the human respiratory system. Standards for $PM_{2.5}$, a subset of PM_{10} including the finer size particles, are being phased in by EPA.

SILs are quantitatively defined in EPA regulations. For criteria air pollutants, the extent of the direct impact area is defined by the maximum radius in which the proposed Project is shown by air dispersion modeling to represent a significant contribution to air pollutant levels. In non-attainment areas, the SIL represents the allowable impact for any new project.

Table 3.6-1 summarizes the SILs, NAAQS, Nevada AAQS, and PSD increments for all EPA defined criteria air pollutants. The EEC must demonstrate compliance with applicable ambient air quality impact limits, and document impacts at all points where the proposed project has a significant impact.

TABLE 3.6-1. MODELING SIGNIFICANCE LEVELS AND AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING PERIOD	CLASS II AREA SIGNIFICANT CONTRIBUTION LEVEL (SIL) [(a)]	CLASS I AREA SIGNIFICANT CONTRIBUTION LEVEL (SIL) [(a)]	NATIONAL AAQS	NEVADA AAQS	PSD CLASS II INCREMENT	PSD CLASS I INCREMENT
		($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
NO2	Annual	1	0.1	100	100	25	2.5
SO2	Annual	1	0.1	80	80	20	2
	24 hours	5	0.2	365[(b)]	365	91[(b)]	5[(b)]
	3 hours	25	0.1	1,300[(b)]	1,300	512[(b)]	25[(b)]
CO	8 hours	500	1.0	10,000[(b)]	10,000[(c)]	NA	NA
	1 hour	2,000		40,000[(b)]	40,000	NA	NA
PM10	Annual	1	0.2	Revoked[(d)]	50	17	4
	24 hours	5	0.3	150[(e)]	150	30[(b)]	8[(b)]
PM2.5	Annual	NA	NA	15[(f)]	15[(e)]	NA	NA
	24 hours	NA	NA	35[(g)]	35[(f)]	NA	NA
Lead	Quarterly	NA	NA	1.5	1.5	NA	NA
O_3	1 hour [j]	NA	NA	235[(h)] (0.12 ppm)	235[(h)] (0.12 ppm)	NA	NA
	8 hour	NA	NA	147[(i)] (0.075 ppm)	147[(i)] (0.075 ppm)	NA	NA

$\mu g/m^3$ Microgram per cubic meter NA Not applicable

a Source: EPA 1990

b Not to be exceeded more than once per calendar year

c 6,670 $\mu g/m^3$ at areas equal to or greater than 5,000 feet above mean sea level

d EPA revoked this standard effective December 17, 2006

e Not to be exceeded more than once per calendar year on average over three years

f the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors

g the 3-year average of the 98th percentile at each population-oriented monitor within an area

h The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1. This standard is revoked as of June 15, 2005 in all areas except 8-hour ozone non-attainment areas

i The 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year

j Ozone 1-hour NAAQS applies only in ozone 8-hour non-attainment areas

In Federal Class I areas and federal or tribal land manager (FLM) identified sensitive Class II areas, impacts to AQRVs will be analyzed consistent with guidance from the current Federal Land Managers Air Quality Related Values Workgroup (FLAG) Phase 1 Report (FLAG 2000) to ensure sensitive species would not be adversely affected. The FLAG report recommends AQRV impact thresholds applicable to Class I areas in air permitting analyses. AQRVs identified as a concern by FLMs at Class I and sensitive Class II areas in the study area include visibility and deposition of acids and acid precursors.

Within Steptoe Valley, historical inversion frequency and strength will be used as the basis for analyses of the potential for the EEC emissions to limit visibility or for inversions to trap boiler stack emissions in the valley. High humidity conditions when temperatures are above freezing (when the EEC's proposed wet coolers could be operated) will be used as an indicator of the potential for fog formation or enhancement caused by proposed actions.

The NAAQS and the Nevada AAQS define air pollutant concentrations that are not to be exceeded in ambient air. Another potentially more restrictive limit to allowable air pollutant impacts in areas with clean air would be the PSD increment limits that define the maximum allowable cumulative increase in pollutant concentrations after PSD baseline conditions were set. The PSD baseline dates vary within the project area. They were set primarily by 1990 or earlier. PSD increment limits are lower in Federal Class I areas — areas pre-defined by federal or state actions where pristine air quality is to be preserved.

3.6.3 Existing Conditions

3.6.3.1 Climate

The project area includes a four season environment with cold winters in the primary activity areas. Mild winters occur only on the more distant reaches of the associated electric transmission lines well to the south of the EEC Plant Site(s). Precipitation levels are light in the valleys, and slightly higher in the surrounding mountains. **Table 3.6-2** summarizes meteorological conditions within and near the project area.

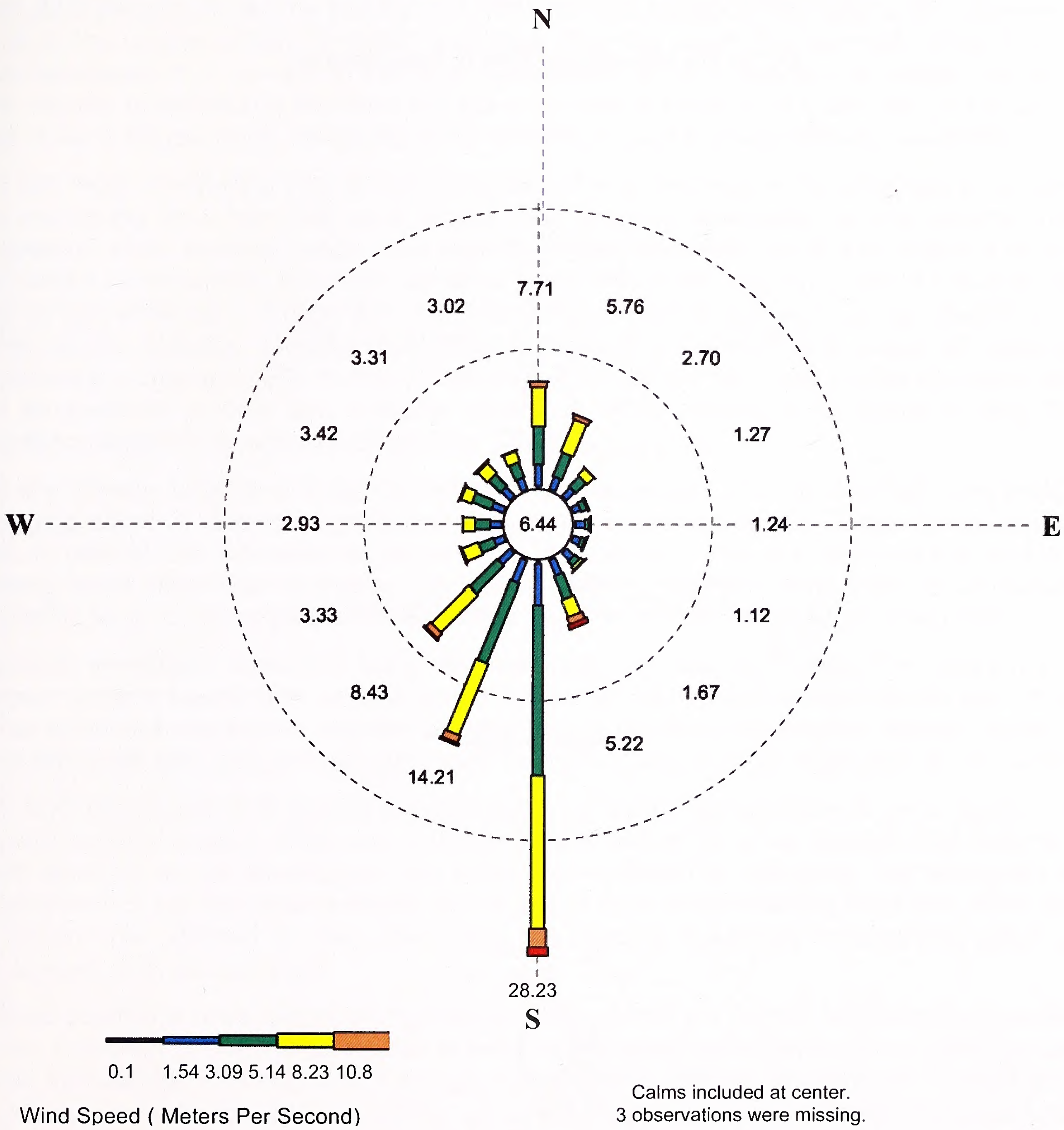
TABLE 3.6-2. METEOROLOGICAL CONDITIONS WITHIN AND NEAR THE PROJECT AREA

MONITOR	ELEV (FT)	WINTER AVERAGE	SPRING AVERAGE	SUMMER AVERAGE	FALL AVERAGE	ANNUAL AVERAGE
MEAN SEASONAL TEMPERATURE AVERAGE (°F)[1]						
Currie Highway	5,820	29.7	52.0	61.2	32.2	43.9
Ely	6,260	30.5	50.8	63.0	34.7	44.3
Kimberly	7,230	27.3	49.6	64.1	36.2	44.3
Lages	5,960	32.0	54.0	66.4	36.7	47.3
McGill	6,350	31.7	53.2	66.7	38.3	47.5
MEAN SEASONAL PRECIPITATION AVERAGE (INCHES)[1]						
Currie Highway	5,820	1.27	2.30	1.89	1.70	7.16
Ely	6,260	2.51	2.89	2.43	2.15	9.98
Kimberly	7,230	4.02	3.07	2.06	2,88	12.03
Lages	5,960	2.06	2.04	1.78	1.89	8.25
McGill	6,350	1.97	2.79	2.16	1.90	8.81
MEAN SEASONAL SNOWFALL / SNOW COVER (INCHES)[1]						
Currie Highway	5,820	14.8 / 0.7	3.2 / 0	0 / 0	7.6 / 0.3	25.6 / 0
Ely	6,260	25.2 / 1.7	9.1 / 0	0.3 / 0	15.7 / 0.3	50.4 / 1
Kimberly	7230	48.4 / 8.7	9.8 / 0.3	0.3 / 0	24.0 / 1.7	82.3 / 3
Lages	5960	14.0 / 1	0.9 / 0	0 / 0	5.6 / 0	20.5 / 0
McGill	6350	11.9 / 0.7	2.5 / 0	0 / 0	5.2 / 0	19.7 / 0

Source: Western Regional Climate Center (WRCC) 2006
°F = degrees Fahrenheit
[1] For mean monthly temperature, mean monthly precipitation, and mean monthly snowfall, the period used for Currie Highway Station is 1961 to 1991, for Kimberly is 1948 to 1958, for all others is from inception of monitoring (1897 in Ely, 1914 in McGill, and 1984 in Lages) through 2006.

Ground level wind patterns in the vicinity of the proposed EEC and in Steptoe Valley are dominated by terrain. Steptoe Valley is generally aligned north or north-northeast to south or south-southwest. **Figure 3.6-1** provides a wind rose showing the frequency of wind directions and intensities measured at 20 feet (6.1 meters) at the National Weather Service (NWS) station at the Ely Yelland Field airport based upon data from 1986 to 1990. Measurements from this elevation to 10 meters are considered representative of surface winds by the NWS. The wind rose shows that predominant and strongest winds at the site are from the south and southwest with moderate frequency and wind speeds from the north and northeast.

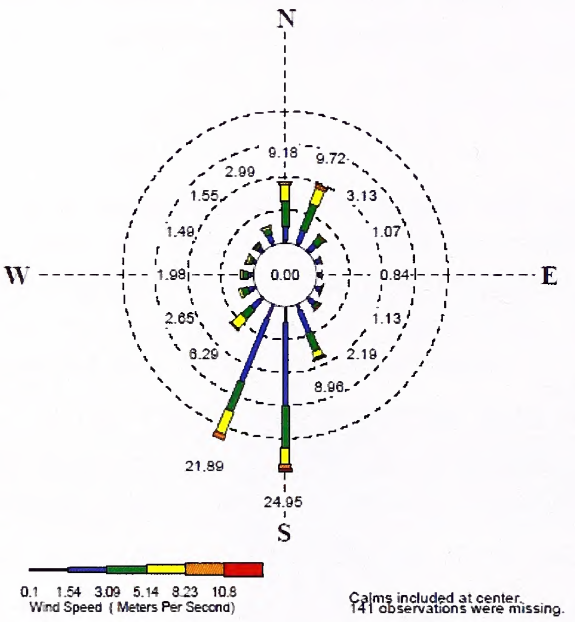
Figure 3.6-1. Ely Yelland Field NWS Ely, NV 6.1-Meter Level Wind Rose, 1986-1990



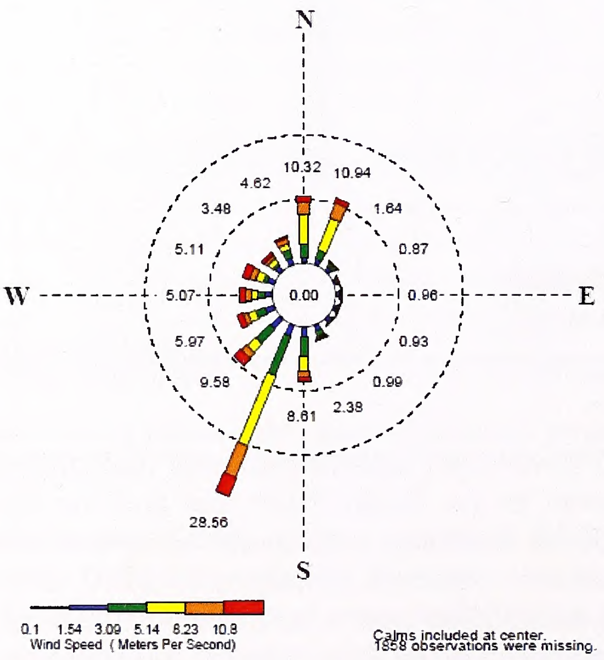
The Proponents of the EEC have been collecting on-site meteorological data from monitoring equipment at two sites adjacent to the South Plant Site and the North Plant Site Alternative locations since the fall of 2006. At each site, a 50-meter-high meteorological tower was installed with meteorological measurements collected at heights of 2, 10, and 50 meters. In addition, a SODAR monitoring system was installed and is collecting or inferring wind data at heights from 50 meters up to approximately 400 meters above ground level. **Figure 3.6-2** shows a wind rose for data for the 10-meter winds (representative of surface conditions), and another for winds 200 meters (656 feet) above ground level, collected at the South Plant Site for data collected from September 2006 through August 2007.

Figure 3.6-2. South Plant Site Wind Rose, September 2006 – August 2007

EEC On-Site Meteorological Data, 10-Meter Windrose



200-Meter Windrose



A comparison of surface wind roses from the Ely, Nevada NWS station and the on-site meteorological station shows that the predominant winds at the Ely NWS station blow from the south 28.2 percent of the time and south-southwest 14.2 percent of the time, while predominant winds at the on-site station 10 meter level blow from the south 25.0 percent of the time and south-southwest 21.9 percent of the time. Magnitudes of wind speeds are similar. As can be seen visually by inspecting the NWS Ely site wind rose in **Figure 3.6-1** and the on-site surface wind roses in **Figure 3.6-2**, the predominant wind regimes in the two datasets are similar.

The 200 meter monitoring data is located below but near the tops of the proposed boiler stack. The monitoring data from that level shows wind flow still dominated by the Steptoe Valley geography, which features valley walls well above that elevation, but it also shows a stronger component of winds from the west. Winds at levels above the ridgelines tend to have a more west to east orientation, though they vary with the weather pattern and can be affected by the higher terrain features. On-site monitoring measured or inferred[2] the upper air wind and temperature profile up to 500 meters (1,640 feet) since September 2006. Higher elevation winds and temperature profiles are available from the NWS Yelland field station in Ely. That information supports air pollution dispersion modeling analyses.

The dry climate leads to a large diurnal temperature range, with daytime high temperatures averaging about 30 degrees higher than daily minimum temperatures. Those diurnal changes tend to lead to the formation of temperature inversions during the late evening and early morning hours when cold air settles into the valleys. Fog can also form under these inversion conditions as air cools and the amount of water vapor it can hold as moisture decreases.

Overnight inversions commonly occur on most nights in Steptoe Valley. The inversions are typically surface based with vertical extent limited to 200 to 500 meters above the ground. These inversions can persist into the following day during the cold weather season, especially when winds are light, but generally get mixed out by mid-day on most days, even in the winter.

With Ely's dry climate (9.98 inches of precipitation per year), fog formation is generally limited to the cold weather season when the atmosphere's temperature is low enough that there is as much moisture as the atmosphere can hold. Fog formation is rare when the temperature is above freezing; periods when ambient temperatures exceed the freezing point and when there is high humidity (defined as dew point within two degrees of existing temperature) occur only two percent of all annual hours.

Climatic conditions have historically fluctuated, evolving into the current conditions as described above. Evidence of historic variations includes multiple ice ages in the recent geologic past. Those fluctuations continue. Current evidence seems to indicate an increase in mean global temperature over the last century which might be accelerating in pace. Seven of the ten hottest years on record occurred in the last decade. Temperature changes can affect the quantity and distribution of precipitation because of associated weather pattern changes. At the same time, mean ambient concentrations of greenhouse gases, which let in short wave radiation from the sun, but block outgoing long wave radiation, have been documented to have been increasing.

Figure 3.6-3 documents national trends in temperatures measured at NWS sites since the early 20th century. Mean temperature rises are seen across the country, with some of the most significant changes since the 1940s, averaging about a 1 degree increase per decade, in eastern and central Nevada. Similar NWS data since the 1930s shows mean precipitation

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[2] The SODAR does not measure wind directly; it infers it from other information.

increases have been noted since the 1930s across most of the eastern and central U.S. While much of the western U.S. has experienced flat or downward trending precipitation levels, northeastern Nevada has seen a mean precipitation increase of less than one inch per decade (NOAA 2008).

Climate change is addressed in **Section 3.6.3.3**.

3.6.3.2 Air Quality

Current Local Air Quality

Ambient air quality monitors were installed at each of the proposed plant sites and measured existing concentrations of NO_x, SO_2, PM_{10}, CO, lead, and O_3, the EPA criteria pollutants, for one year. The on-site system collected measurements for a minimum of one year. **Table 3.6-3** summarizes the air pollutant concentrations measured during the first completed year of the monitoring effort. Reported values represent the maximum value reported for all short–term averaging periods, or the average of all measured values for the period.

For the shorter averaging periods, the only pollutant measured at or above half the NAAQS was 1-hour average ozone. No other measured pollutant value reached 25 percent of the NAAQS. Data trends indicate that annual average readings will also be less than 25 percent of the applicable annual NAAQS limits. The Nevada Bureau of Air Pollution Controls does not recommend any direct estimate of unmeasured $PM_{2.5}$ concentrations from measured PM_{10} values because the fine fraction of the PM_{10} varies with the source of the particulates (for example, the fine fraction is high for smoke which features fine particulates, but low for larger particles like road dust. The $PM_{2.5}$ NAAQS would not be reached at the project monitoring sites since the measured PM_{10} are well below those $PM_{2.5}$ thresholds.

TABLE 3.6-3. SEPTEMBER 2006 - AUGUST 2007 BACKGROUND DATA

POLLUTANT	AVERAGING PERIOD	SOUTH PLANT SITE SEPT 2006 – AUGUST 2007 AMBIENT BACKGROUND CONCENTRATION (μg/m³)	NORTH PLANT SITE JANUARY – DECEMBER 2007 AMBIENT BACKGROUND CONCENTRATION (μg/m³)
SO_2	3 hours	4.0	12.8
	24 hours	3.7	11.9
	Annual	3.0	4.9
PM_{10}	24 hours	19.0[d]	8.1 [a]
	Annual	7.0	2.4 [a]
NO_2	Annual	3.7	2.5
CO	1 hour	2,415	1635.7
	8 hours	2,358	1272.1
O_3	8 hours	72[b]	72 [c]

[a] Data currently available only for September 2006 through February 2007
[b] Fourth maximum
[c] Second maximum, prior to NDEP QA review
[d] Second maximum for PSD modeling, first max 24 hour average PM-10 measured value was 23.6

Rate of Long-Term Trend Temperature Change (top; °F per decade) & Precipitation Change (bottom; inches per decade) – FULL YEAR

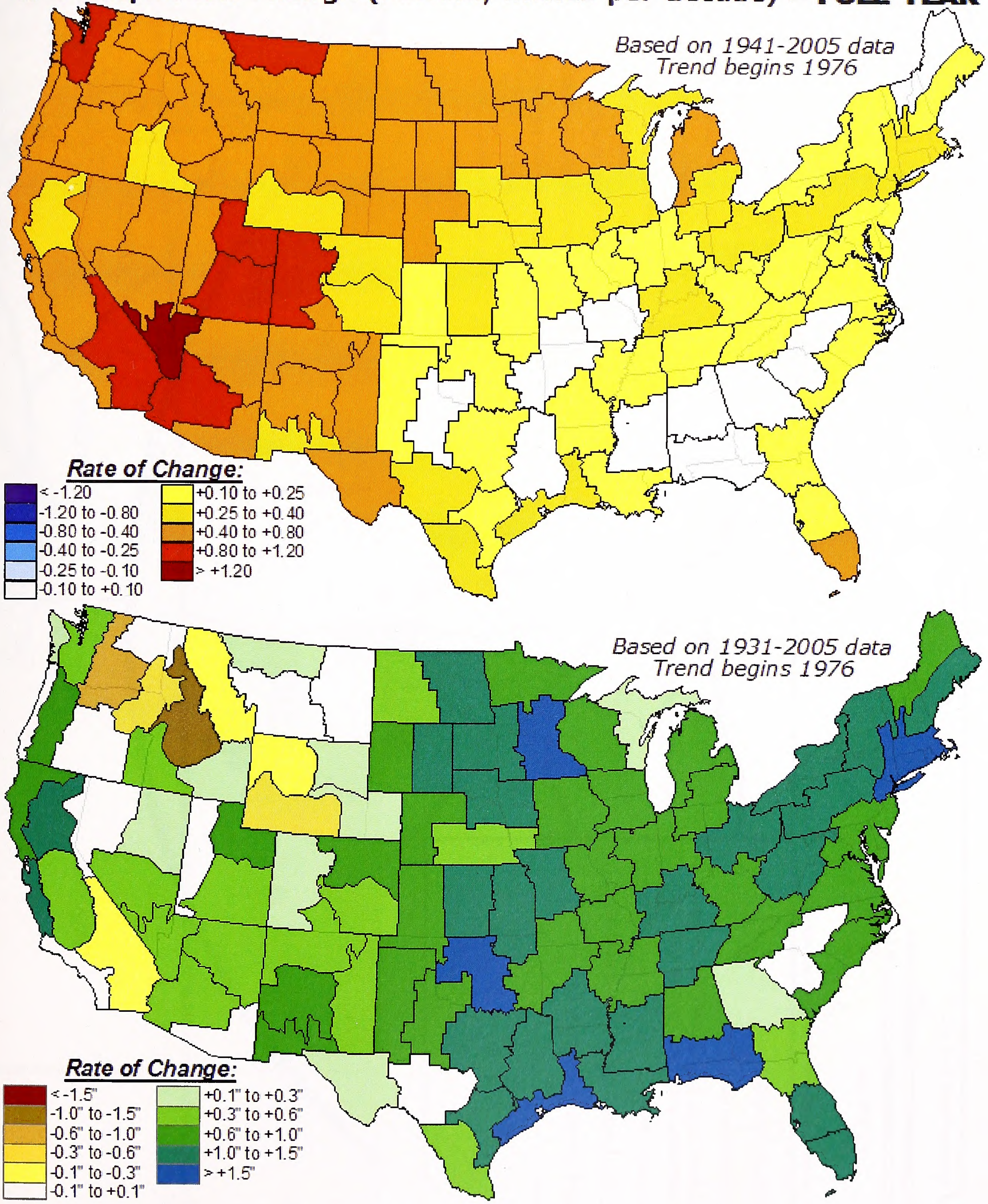


FIGURE 3.6-3
NATIONAL WEATHER SERVICE
LONG-TERM TEMPERATURE TREND DATA
ELY ENERGY CENTER

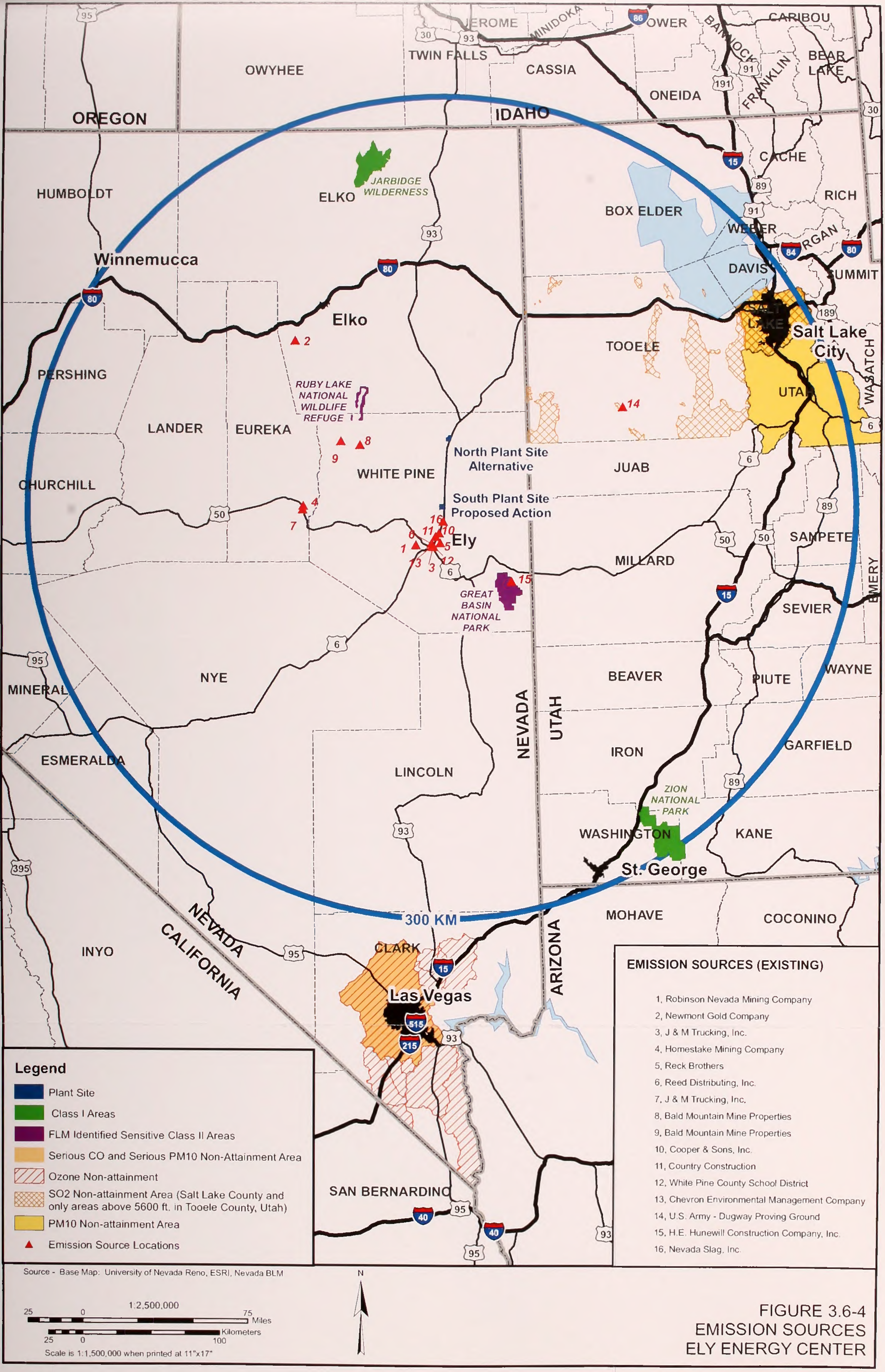


FIGURE 3.6-4
EMISSION SOURCES
ELY ENERGY CENTER

Summary of Regional Air Quality

The entire Steptoe Valley, and all areas where moderate impacts are predicted for any pollutant, are currently in attainment or unclassified for all air pollutants. The only non-attainment area within 200 kilometers (124 miles) of the proposed EEC site(s) is in Tooele County, Utah, which is classified non-attainment for SO_2 at elevations above 5,600 feet. The more distant Washoe County has CO and PM_{10} non-attainment in the Truckee Meadows hydrographic basin including urban Reno and Sparks. Clark County, Nevada, over 300 kilometers from the proposed EEC site(s), has non-attainment areas covering hydrographic basin 212 including Las Vegas for CO and PM_{10}, and that hydrographic basin and a few other surrounding ones as shown in **Figure 3.6-4** for ozone. The southernmost section of the Project's proposed transmission line would include construction, but not operational impacts in the Clark County ozone non-attainment area, but would avoid the CO and PM_{10} non-attainment areas. Few, if any, measured values of volatile organic compound (VOC), hazardous air pollutant levels, or greenhouse gas concentrations representative of the project area are available. Non-attainment or maintenance areas exist within 300 kilometers along the Wasatch Front in Utah in Salt Lake County (non-attainment pending proposed re-designation to attainment for PM_{10} and SO_2, maintenance for CO and ozone), Utah County (non-attainment pending re-designation for PM_{10}), Davis County (maintenance for ozone), and Ogden City and Provo/Orem (maintenance for CO).

The federal PSD program regulates allowable increases in air pollutants after major and minor source baseline dates set by historic air permitting actions. The NDEP implements the PSD program, and tracks PSD baseline dates. The Nevada statewide major source baseline date for SO_2 was set on January 6, 1975. PSD minor baseline dates in Hydrologic Basin 179, which includes Steptoe Valley in which the EEC is proposed, have been set for PM_{10} on June 4, 1979 and for SO_2 on November 28, 1984. No minor source baseline date has been set for the areas the Jarbidge Wilderness covers. The PSD SO_2 minor source baseline date for the area in which Zion National Park resides in Utah was set in April, 1990.

Monitoring of criteria pollutants in east-central Nevada has been very limited since the late 1990s. The NDEP discontinued historic PM_{10} monitoring when EPA allowed monitoring to cease where long-term monitoring showed pollutant trends at less than 60 percent of the NAAQS. PM_{10} monitoring in McGill from 1993 to 1998 showed only one 24-hour average PM_{10} value over 75 ug/m^3 (half of the 24-hour average NAAQS for PM_{10}) in six years. PM_{10} monitoring in Baker showed annual average concentrations under 12 ug/m^3 each year from 1993 to mid-1995 at the Lehman Caves maintenance building, and only one 24-hour average reading over 25 ug/m^3 during that period. . From May 1995 to June 1997, monitoring at the IMPROVE site within a few hundred meters of Lehman Caves (within Great Basin National Park) showed only one 24-hour PM_{10} concentration measured over 26 ug/m^3, with the highest annual average PM_{10} concentration of 11 ug/m^3. Those trends continue, with PM_{10} monitoring at Lehman Caves showing annual average concentrations under 10 ug/m^3 and 90th percentile concentrations under 18 ug/m^3 every year through 2005. Those historic regional monitoring efforts indicate very low particulate levels in rural portions of the project area, with levels slightly elevated, but well below state or EPA air quality standards in the developed areas. No NDEP monitoring for any other pollutant has occurred regularly in or near the Steptoe Valley since the smelter in McGill ceased operations in the 1980s. The nearest ongoing air quality monitoring stations are the NDEP PM_{10} monitoring sites in Elko, north of the Steptoe Valley, and at battle Mountain to the northwest. Each of those stations shows consistent compliance with the NAAQS and Nevada AAQS.

Two federally protected Class I areas exist within 300 kilometers of the proposed EEC site(s), the range agreed upon by NDEP and FLMs as appropriate for this project's AQRV impact study. The two Class I areas are the Jarbidge Wilderness, which is located approximately 240 km north of the South Plant Site at its nearest point; and Zion National Park, located approximately 260 km southeast of the South Plant Site at its nearest point. The North Plant Site is approximately 40 km closer to the Jarbidge Wilderness, and a comparable distance further away from Zion National Park.

FLMs identified two sensitive Class II areas within 100 km of the proposed Project where they requested analyses of impacts on air quality and AQRVs. Those two sites are Great Basin National Park located approximately 60 km southeast of the South Plant Site at its nearest point; and the Ruby Lake National Wildlife Refuge located approximately 85 km northwest of the South Plant Site at its nearest point. The North Plant Site Alternative is approximately 40 km more distant from Great Basin National Park, and within 65 km of the nearest point in the Ruby Lakes National Wildlife Refuge. **Figure 3.6-4** shows the Class I and FLMs identified sensitive Class II areas within the analysis area.

Table 3.6-4 documents the annual average and 90th percentile 24 hour average readings in two particulate categories: fine particulates ($PM_{2.5}$), and inhalable particulates (PM_{10}), at each of the three Integrated Monitoring of Protected Visual Environments (IMPROVE) monitoring sites at sensitive receptors within the project area. The 90th percentile reading shows particulate levels near the highest daily concentrations observed. **Figure 3.6-5** shows graphically the trends in mean and 90th percentile measured PM_{10} concentrations at each of the Class I areas and at the sensitive Class II area for which monitoring data is available: Great Basin National Park, Jarbidge Wilderness, and Zion National Park.

Figure 3.6-5. Trends in Measured PM10 Concentration Class I and Sensitive Class II Areas

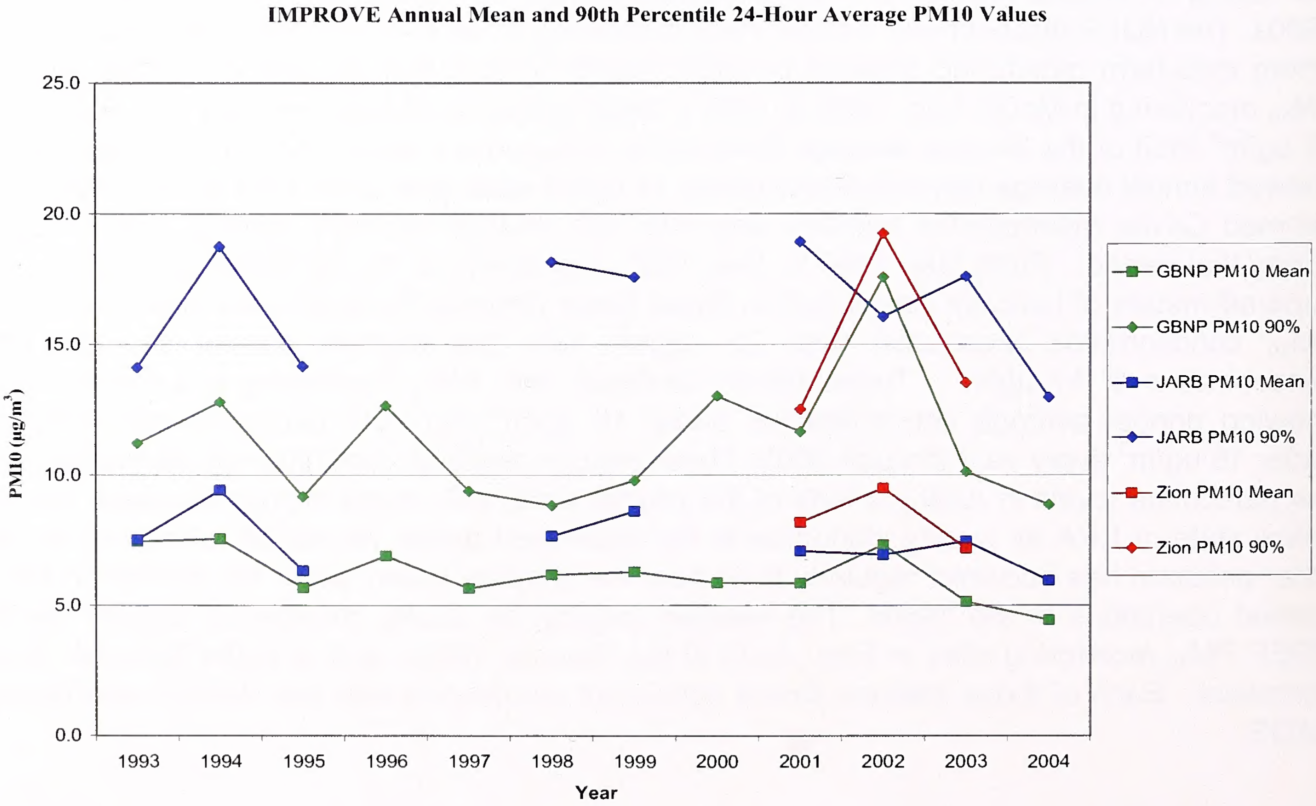


Table 3.6-4 also documents ozone measurements from a Clean Air Status and Trends Network (CASTNET) site. The federal and state ozone ambient air quality standard was lowered from 80 parts per billion (ppb) to 75 ppb in May 2008. Compliance with the ozone standard is based upon the fourth highest eight-hour average concentration. Annual fourth highest eight-hour average ozone concentration is shown in **Table 3.6-4**.

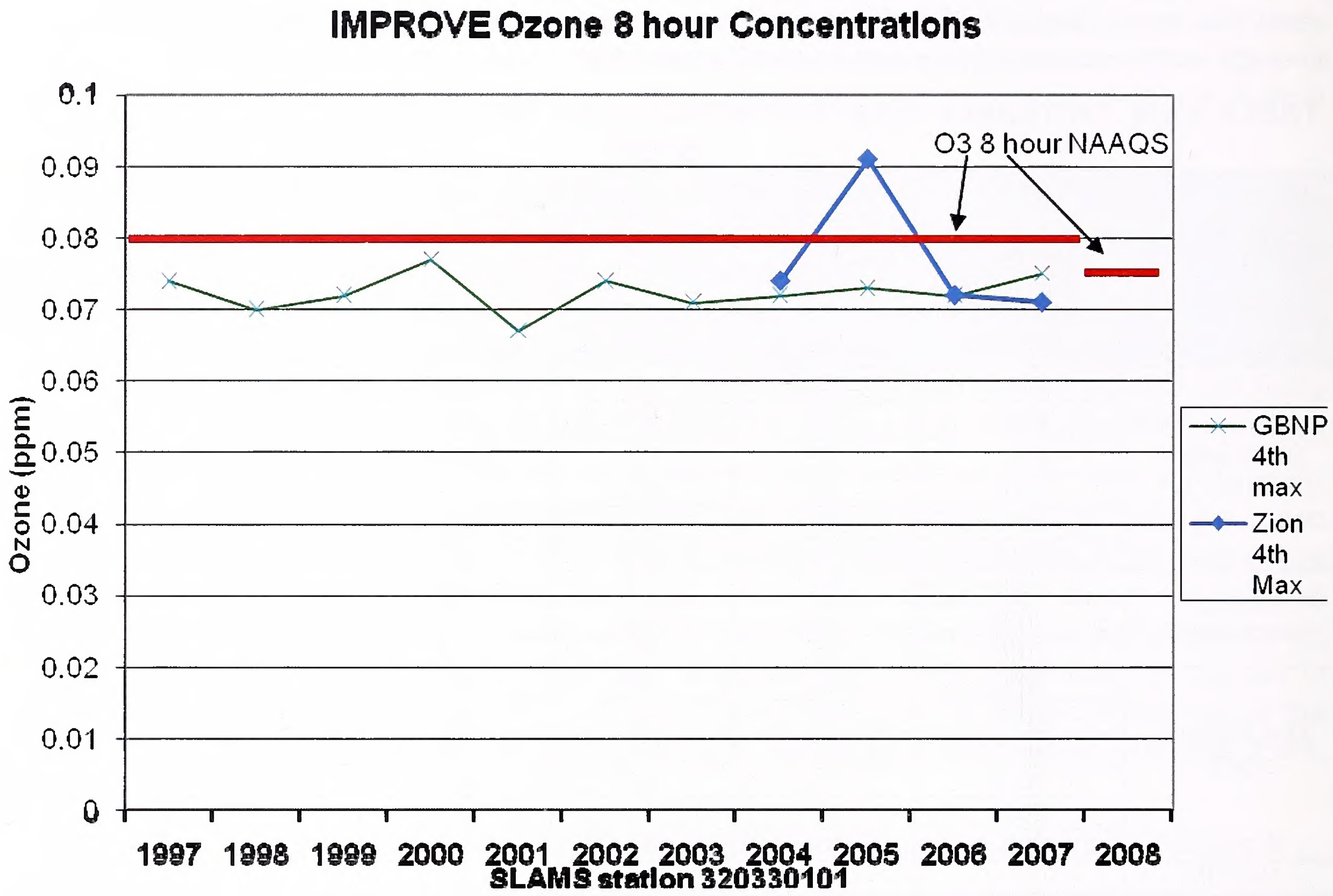
TABLE 3.6-4. CRITERIA POLLUTANT MONITORING DATA FROM SENSITIVE RECEPTOR SITES

MONITORING SITE	AVERAGING PERIOD	CASTNET OZONE CONC. (PPB)	IMPROVE $PM_{2.5}$ CONCENTRATION [F] ($\mu G/M^3$)		IMPROVE PM_{10} CONCENTRATION [F] ($\mu G/M^3$)	
		8 HR AVERAGE	ANNUAL AVERAGE	90^{TH} PERCENTILE	ANNUAL AVERAGE	90^{TH} PERCENTILE
Great Basin National Park	2007	75	NA	NA	NA	NA
	2006	72	NA	NA	NA	NA
	2006	73	NA	NA	NA	NA
	2004	72	2.1	4.1	4.4	9.8
	2003	71	2.0	4.7	4.3	9.8
	2002	74	2.6	6.7	5.9	17.4
Jarbidge Wilderness	2004	NA	2.2	5.9	4.6	13.0
	2003	NA	2.2	5.9	5.6	15.8
	2002	NA	2.1	7.9	5.9	15.8
Zion National Park	2004	71	NA	NA	NA	NA
	2006	72	NA	NA	NA	NA
	2005	91	NA	NA	NA	NA
	2004	74	NA	NA	NA	NA
	2003	NA	3.5	6.7	6.5	12.0
	2002	NA	3.4	7.8	7.7	19.5
NAAQS		75 [a]	15 [b]	35 [c]	[d]	150 [e]

[a] based upon a three year average of the fourth highest daily maximum eight hour average, revised in 2008
[b] based upon 3 year average of weighted annual mean concentrations
[c] based upon three year average of the 98^{th} percentile of 24 hour average
[d] long standing PM_{10} annual average standard of 50 ug/m^3 revoked in 2006
[e] Not to be exceeded more than once per year on average over 3 years
[f] Reported values are IMPROVE gravimetric PM_{10} and $PM_{2.5}$ values

Figure 3.6-6 shows the trends for first through fourth highest 8-hour average ozone measurements at GBNP. The graph shows that from 1997 through 2007, the fourth highest ozone reading each year approaches or in one or two cases reaches the newly lowered NAAQS standard of 0.75 ug/m^3, but that the area meets that NAAQS standard because the average fourth maximum concentration over three consecutive years never exceeds 0.75 ug/m^3.

Figure 3.6-6. 8 Hour Average Ozone Concentration Trends at Class I and Sensitive Class II Areas



Visibility

The Cooperative Institute for Research in the Atmosphere operates a network of visibility monitoring stations in or near Class I areas, and publishes IMPROVE data documenting those measurements. The purpose is to identify and evaluate patterns and trends in regional visibility. Data from IMPROVE monitors in and near the analysis area show that fine ($PM_{2.5}$) and coarse (PM_{10}) particulates are the largest contributors to the impairment of visibility; other air pollutants tend to have lesser impacts on visibility. These particulates impact the standard visual range (i.e., the distance that can be seen on a given day) from each monitor location. IMPROVE monitors measure visibility and particulate concentrations among other parameters. Each of the Class I areas in the project area and one of the two identified sensitive Class II area (Great Basin National Park) have, or have had, IMPROVE monitors. There is no air quality or visibility monitoring data available from the IMPROVE system or any other known source for the other identified sensitive Class II area, Ruby Lake National Wildlife Refuge. Standard visual ranges for the most recent year of monitoring data summaries are documented in **Table 3.6-5** at each of the Class I areas in the project area and the one identified sensitive Class II areas for which data is available. The data indicates visual range on their best (median of the highest 20 percent of readings), worst (median of the lowest 20 percent of readings), and average (annual mean) visibility days in 2004 (2003 for Zion National Park because no data was available for 2004).

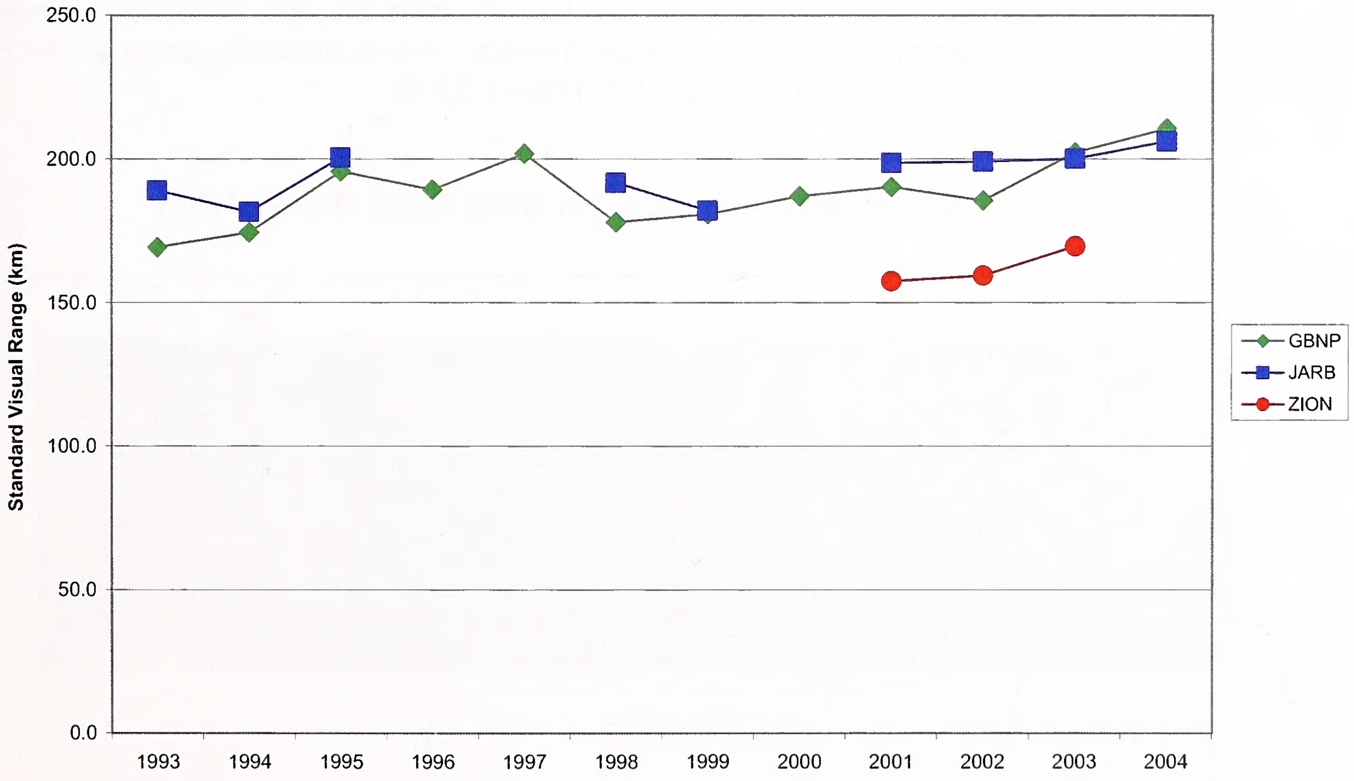
TABLE 3.6-5. STANDARD VISUAL RANGES FROM IMPROVE MONITORS NEAR PROJECT AREA

MONITOR	BEST VISIBILITY DAYS KM (MILES)		INTERMEDIATE VISIBILITY DAYS KM (MILES)		WORST VISIBILITY DAYS KM (MILES)	
Great Basin National Park	293	(182)	211	(131)	155	(96)
Jarbidge Wilderness	304	(189)	206	(128)	137	(85)
Zion National Park	243	(151)	170	(105)	110	(68)

SOURCE: Interagency Monitoring of Protected Visual Environments 2005

Figure 3.6-7 shows the measured mean standard visual range reported on the IMPROVE website for those three monitoring sites, with all available data meeting quality assurance standards from 1993 to 2003. The mean visual ranges measured at GBNP and Jarbidge Wilderness, are some of the highest mean visual ranges reported in the US.

Figure 3.6-7. Measured Mean Standard Visual Range at Class I and Sensitive Class II Areas

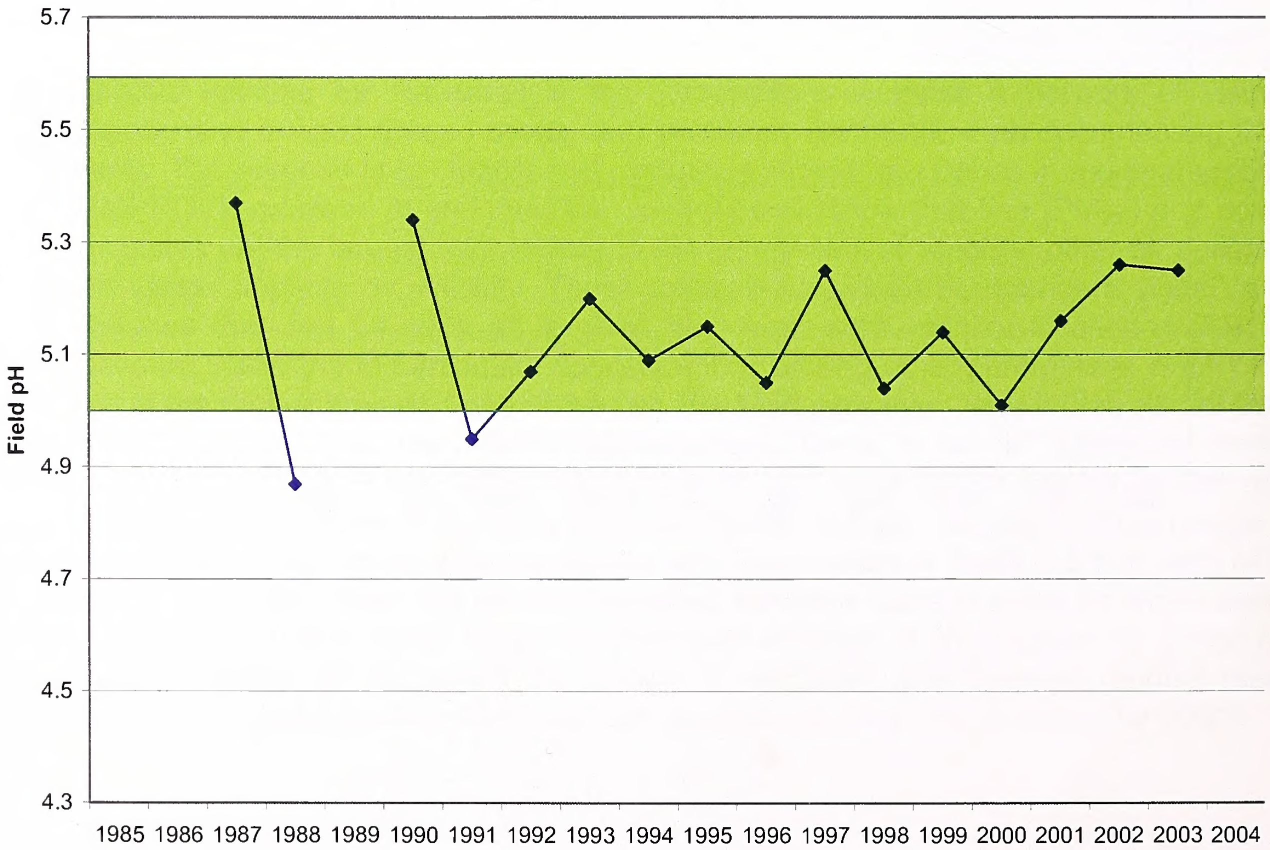


Rainfall pH, Deposition of Nitrates and Sulfates

Two national research programs, the National Atmospheric Deposition Program (NADP) and the CASTNET, monitor the deposition rates of sulfates and/or nitrates in the project area vicinity, and atmospheric concentrations of other components involved in atmospheric chemical transformation of SO_2 and NOx emissions in the atmosphere. Dry deposition rates are indicators of the acids or acid precursors most commonly deposited to the earth's surface from the atmosphere when it is not raining or snowing. Rainfall pH is a direct measurement of the acidity of precipitation or wet atmospheric deposition.

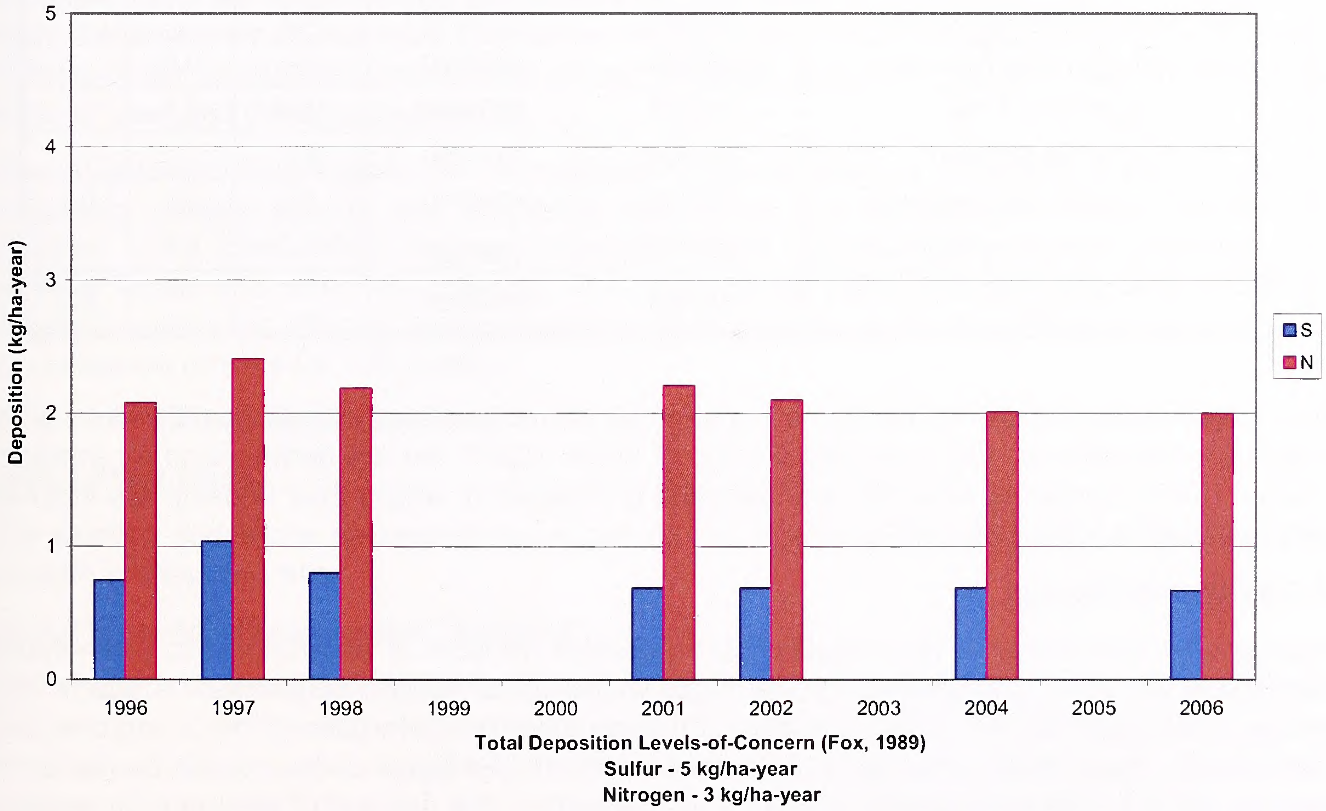
The NADP is a nationwide network of precipitation monitoring sites. The network is a cooperative effort between many different groups, including the State Agricultural Experiment Stations, U.S. Geological Survey, U.S. Department of Agriculture, and numerous other governmental and private entities. The NADP monitoring network has grown from 22 stations at the end of 1978 to over 250 sites spanning the continental United States, Alaska, Puerto Rico, and the Virgin Islands. The purpose of the network is to collect data on the chemistry of precipitation for monitoring of geographical and temporal long-term trends. The precipitation at each station is collected weekly, and is then sent to a central analytical laboratory where it is analyzed for hydrogen (acidity as pH), sulfate, nitrate, ammonium, chloride, and base elements including calcium, magnesium, potassium, and sodium. The NADP program has maintained a monitoring station at GBNP since at least 1985. **Figure 3.6-8** shows the trends in measured rainfall pH at that site. Mean rainfall pH over that period measured onsite has averaged 5.16. The annual average rainfall pH values over the last two decades through 2006 have ranged from 4.87 to 5.84. Those measured values indicate "normal", non-acidic rain, which would be expected to have a pH between 5.0 and 5.6 (green in **Figure 3.6-8**).

Figure 3.6-8. Annual Mean Rainfall pH at Great Basin National Park



CASTNET is the nation's primary source for data on dry acidic deposition and rural, ground-level ozone. Operating since 1987, CASTNET was created by EPA and the National Oceanic and Atmospheric Administration (NOAA) to be used in conjunction with other national monitoring networks to provide information for evaluating the effectiveness of national emission control strategies. CASTNET consists of over 80 sites across the eastern and western United States and is cooperatively operated and funded with the National Park Service (NPS). CASTNET provides atmospheric data on the dry deposition component of total acid deposition, ground-level ozone and other forms of atmospheric pollution. CASTNET is considered the nation's primary source for atmospheric data to estimate dry acidic deposition and to provide data on rural ozone levels. The CASTNET program has operated a monitoring site at GBNP since at least 1995. **Figure 3.6-9** shows CASTNET and NADP monitoring results from 1996 to 2006. Data is intermittent, partially due to low precipitation volumes and system quality assurance. CASTNET data shows total sulfur deposition rates at that site averaging 0.76 kilograms per hectare per year (4.1 pounds per acre per year) over that period. Total nitrogen deposition rates averaging 2.14 kilograms per hectare per year (11.6 pound per acre per year), with wet nitrogen deposition averaging 1.35 kilograms per hectare per year (7.3 pound per acre per year).

Figure 3.6-9. Total Sulfur and Nitrogen Deposition at Great Basin National Park



Existing and Foreseeable Air Pollutant Emission Sources

A number of other existing sources of emissions of air pollutants were identified in the project area and its vicinity. One foreseeable emission source for which there is a complete application for an air quality permit, the White Pine Energy Station, was also identified by NDEP. **Table 3.6-6** documents the air pollutant emissions sources recommended by the NDEP to be included in the near field impact analysis, in addition to background conditions, to assess air pollutant

concentrations and impacts when the EEC power plant is operational. Each of these sources is also shown on **Figure 3.6-4**.

TABLE 3.6-6. NEARBY EXISTING OR REASONABLY FORESEEABLE SOURCES

FACILITY NAME	UTM LOCATION (ME)	UTM LOCATION (MN)	POTENTIAL TO EMIT (LBS/HR)		
			PM_{10}	NO_2	SO_2
White Pine Energy Station (foreseeable)	691242.7	4399588	633	1165	1387
H E Hunewill Construction Co., Inc.	740760	4321140	107.5		86.6
Robinson Nevada Mining Company	671580	4347540	104.4	5.8	4.0
Newmont Gold Company	583930	4495990	7.9		
J & M Trucking, Inc.	684020	4346150	0.9		
Homestake Mining Company	589940	4376280	0.02		
Reck Brothers	689110	4348990	4.5	2.3	
Nevada Slag, Inc.	691300	4364600	14.3	2.4	
Reed Distributing, Inc.	682780	4348580	0.005		
J & M Trucking, Inc.	589410	4373560	0.9		
Bald Mountain Mine Properties	630900	4420250	0.2		
Bald Mountain Mine Properties	617000	4423100	0.4	0.6	
Cooper & Sons, Inc.	688350	4356200	10.8	3.2	
Country Construction	685820	4353520	3.3		
White Pine County School District	684170	4346840	2.1	0.3	0.1
Chevron Environmental Mgmt Co.	683560	4347130		0.4	
U.S. Army - Dugway Proving Ground – Utah	820553	4448686			5.2

Other foreseeable sources which did not have an air permit declared complete at the time of the air permit application for the proposed facility, or which NDEP did not recommend for inclusion in the air quality modeling analysis, are identified in Chapter 5, where their impacts are included in the cumulative impact discussion.

3.6.3.3 Climate Change

Ongoing scientific research has identified the potential impacts of anthropogenic (man-made) greenhouse gas (GHG) emissions and changes in biological carbon sequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused CO_2(e) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPCC 2007) recently concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.”

Global mean surface temperatures have increased nearly 1.8°F from 1890 to 2006. Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24° N) have exhibited temperature increases of nearly 2.1°F since 1900, with nearly a 1.8°F increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 2.5 to 10.4°F above 1990 levels. The National Academy of Sciences has confirmed these findings, but also has indicated there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. Increases in temperatures would increase water vapor in the atmosphere, and reduce soil moisture, increasing generalized drought conditions, while at the same time enhancing heavy storm events. Although large-scale spatial shifts in precipitation distribution may occur, these changes are more uncertain and difficult to predict.

Although there are uncertainties associated with the science of climate change, this does not imply that scientists do not have confidence in many aspects of climate change science. Some aspects of the science are known with virtual certainty, because they are based on well-known physical laws and documented trends.

Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires, and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs will have a sustained climatic impact over differing temporal scales. For example, recent emissions of carbon dioxide can influence climate for 100 years.

3.6.4 Proposed Site Conditions

3.6.4.1 Plant Sites

The existing conditions presented above are representative of the proposed EEC plant site(s) situated in Steptoe Valley.

3.6.4.2 Electric Transmission Facilities

The electrical transmission facilities include a long linear range to the south of the proposed EEC plant site(s). The vast majority of the project area associated with the electric transmission lines is in attainment or unclassified for all pollutants. The only portion of the project area that is considered non-attainment for any air pollutant is the southernmost extent of the electrical transmission line, along the SWIP Corridor in Clark County, from the county line to the Harry Allen Substation. Clark County is classified by EPA as serious non-attainment for PM_{10} and CO, and has requested that current non-attainment status for ozone be lifted based upon monitoring since 2003 showing compliance with the ozone NAAQS.

3.6.4.3 Water Supply Facilities

Discussions of the existing air quality in Steptoe Valley and surrounding areas are representative of current conditions at and surrounding the proposed water facilities.

3.6.4.4 Rail Facilities

Discussions of the existing air quality in Steptoe Valley and surrounding areas are representative of current conditions along the proposed rail leads and the Alternative Rail Line corridor from the proposed plant sites, north to Shafter.

3.7 Vegetation, Including Noxious and Non-Native, Invasive Weeds and Special Status Plants

3.7.1 Area of Analysis

The area of analysis for vegetative communities, noxious and non-native, invasive weeds, and special status plants was defined as the potential disturbance footprint of any of the components of the Proposed Action or Action Alternatives being carried forward for full analysis (see **Chapter 2** for detailed descriptions of Project elements). Potential disturbance areas were classified into two groups: site development-related actions, such as plant sites, worker villages, and well fields; and linear-related actions, such as water lines, electric transmission lines, and rail facilities (both Alternative Rail Line and rail leads). Study project areas ranged in width from 200 - 350 feet (Mt. Wheeler Transmission Line), to 600 feet (water lines and new rail construction), to 2,000 - 2,800 feet (electric transmission lines). Areas of analysis for specific Project components are shown in **Tables 3.7-1** through **3.7-4**. Certain project elements, such as water supply lines, rail lines, and transmission lines, shared project study areas in some instances (e.g. the water supply line and Alternative Rail Line extending south from the North Plant Site to the South Plant Site), and this is identified in the table notes. Some elements, such as transmission line Segments 1E, 6A, 1F, and 6B, are wholly encompassed within site development-related survey areas (i.e., Robinson Summit Substation and alternative action project areas), and therefore are not shown as separate elements here. The Coyote Valley Ranch, North, Middle, South, and Limited South Well Fields are similarly contained within other project components, and are also therefore not shown as separate elements. This method of calculation is continued in the vegetative communities' tables in **Section 3.7.3**.

TABLE 3.7-1. APPROXIMATE ACREAGE OF PROPOSED ACTION SITE DEVELOPMENT AREAS OF ANALYSIS

PROJECT ELEMENT	ACREAGE
South Plant Site	2,970
South Plant Site Worker Village	174
Robinson Summit Substation	1,030
Harry Allen Substation	40
Lages Station Well Field	2,823
Coyote Valley Ranch Well Field (Alternative)	22
Limited South Well Field (Alternative)	Within Water Supply Line Corridor (Table 3.7-2)
Middle Well Field (Alternative)	Within Water Supply Line Corridor (Table 3.7-2)
South Well Field (Alternative)	Within Water Supply Line Corridor (Table 3.7-2)

TABLE 3.7-2. APPROXIMATE ACREAGE OF PROPOSED ACTION ALIGNMENT-RELATED AREAS OF ANALYSIS

PROJECT ELEMENT	PROJECT AREA		
	LENGTH [1]	ALIGNMENT STUDY WIDTH	ACREAGE [2]
Mt. Wheeler Transmission Line[3]	14.5 mi.	200-350 ft.	470
Electric Transmission Facilities Corridors			
Segment 1D	20.0 mi.	2,800 ft.	6,772
Segment 3 (Alternative)	12.9 mi.	2,600 ft.	2,311
Segment 4A	13.0 mi.	2,600 ft.	3,783.
Segment 6C	102.3 mi.	2,800 ft.	35,929
Segment 8	56.0 mi.	2,800 ft.	19,655
Segment 9A (Alternative, Line 2)	8.1 mi.	2,800 ft.	1,919
Segment 9B	1[illegible] mi.	2,800 ft.	4,065
Segment 9C	6.6 mi.	1,000 ft.	769
Segment 9D	19.1 mi.	2,800 ft.	6,658
Segment 10 (Alternative, Line 2)	46.0 mi.	1,000 ft.	5,547
Segment 11	38.6 mi.	2,800 ft.	13,418
Water Supply Corridor[4]	44.0 mi.	600 ft.	2,953
Rail Lead Corridor	1.3 mi.	600 ft.	95
Duck Creek Water Supply Corridor (Alternative)	6.0 mi.	600 ft.	436
Alternative Rail Line Corridor[5] (Alternative)	101.5 mi.	600 ft.	4,949

[1] Approximate, rounded to the nearest 0.1 mile.
[2] May not reflect Length x Width calculation, due to overlapping and/or rounding.
[3] Includes segment from Gonder substation to the South Plant Site. Remainder of the Mt. Wheeler Transmission Line occurs within the water supply line alignment.
[4] Pipeline from Lages Station to South Plant Site; Coyote Valley Ranch, Limited South, Middle, and South Well Field water supply alternative pipelines would share the same alignment in varying lengths. See **Table 2.6-1** for specific pipeline alignment lengths.
[5] Section from Lages Station to the South Plant Site is shared with the water supply alignment.

TABLE 3.7-3. APPROXIMATE ACREAGE OF NORTH PLANT SITE ALTERNATIVE DEVELOPMENT AREAS OF ANALYSIS

PROJECT ELEMENT	ACREAGE
North Plant Site	2,969
North Plant Site Worker Village	150
Robinson Summit Substation	Same as Proposed Action
Harry Allen Substation	Same as Proposed Action
Lages Station Well Field	Same as Proposed Action
Coyote Valley Ranch Well Field (Alternative)	Same as Proposed Action
North Well Field (Alternative)	Within Water Supply Line Corridor (Table 3.7-2)
Middle Well Field (Alternative)	Within Water Supply Line Corridor (Table 3.7-2)
South Well Field (Alternative)	Within Water Supply Line Corridor (Table 3.7-2)

TABLE 3.7-4. APPROXIMATE ACREAGE OF ALTERNATIVE ACTION ALIGNMENT-RELATED AREAS OF ANALYSIS

PROJECT ELEMENT	PROJECT AREA		
	LENGTH [1]	ALIGNMENT STUDY WIDTH	ACREAGE [2]
Mt. Wheeler Transmission Line	Same as Proposed Action		
Electric Transmission Facilities Corridors			
Segment 1A (Alternative)	14.8 mi.	2,800 ft.	4,667
Segment 1B	18.4 mi.	2,800 ft.	5,271
Segment 1C	10.3 mi.	2,800 ft.	3,558
Segment 1D	Same as Proposed Action		
Segment 9C	Same as Proposed Action		
Segment 8	Same as Proposed Action		
Segment 9A (Alternative, Line 2)	Same as Proposed Action		
Segment 9B	Same as Proposed Action		
Segment 9C	Same as Proposed Action		
Segment 9D	Same as Proposed Action		
Segment 10 (Alternative, Line 2)	Same as Proposed Action		
Segment 11	Same as Proposed Action		
Water Supply Corridor[3]	Same as Proposed Action		
Rail Lead Corridor[4]	5.0 mi.	600 ft.	364
Alternative Rail Line Corridor[5]	Same as Proposed Action		

[1] Approximate, rounded to the nearest 0.1 mile.
[2] May not reflect Length x Width calculation, due to overlapping and/or rounding.
[3] Lages Station to North Plant Site pipeline follows the same alignment as the Proposed Action. Coyote Valley Ranch, North, Middle, and South Well Field water supply alternative pipelines similarly follow the same alignment in varying lengths. See **Table 2.6-1** for specific pipeline corridor lengths.
[4] Rail lead extends from NNRy to the North Plant Site.
[5] Alternative Rail line follows the same alignment as the Proposed Action from Shafter south to the North Plant Site. See **Table 2.6-1** for specific rail corridor lengths.

The area of analysis and affected environment for indirect impacts to vegetation as a result of air emissions is discussed in detail in **Section 4.6**.

3.7.2 Data Sources and Methodology

The areas of analysis were evaluated through a combination of existing data review, including Southwest Regional GAP data (USGS 2004a), soil surveys, previous biological surveys, and recent aerial photointerpretation; and extensive biological field surveys conducted in fall 2006 and spring/summer 2007. Prior to conducting the vegetation surveys, soil maps and soil descriptions from *Soil Survey of Western White Pine County Area* (NRCS 1988), *Soil Survey of Elko County, Southeast Part* (NRCS 2002), and *Soil Survey of Lincoln County, South Part* (NRCS 2000) were reviewed to familiarize survey crew members with the important vegetation, soil types, and landscape features contained in the survey area. The survey crew also reviewed the list of target noxious and non-native, invasive weeds, and target sensitive plant species and their habitat requirements. Pedestrian surveys were used when nearby access roads were unavailable, or when vegetation communities appeared highly variable, thus requiring detailed inspection to interpret tonal patterns from aerial photographs. Windshield surveys were used where vegetation communities appeared to be consistent and uniform across large expanses, and required only brief visual inspections to confirm aerial signatures. Additionally, aerial surveys via helicopter observation were conducted for the Alternative Rail Line segment extending from Shafter to Mizpah Point, where road access was extremely limited. Community composition, ecological conditions, locations of noxious and non-native, invasive weeds, and

the presence of wildlife were recorded during field surveys. Field-collected vegetative community data was combined with high-resolution National Agriculture Imagery Program (NAIP) aerial imagery dated April 2006 in order to photointerpret any non-field survey areas, or those areas where access was limited.

Vegetative community map units were based on Shiflet (1994) vegetation types, using dominant species to delineate discrete communities. The vegetative communities contained within the survey area are described in **Section 3.7.3.1** in order of prevalence within the project area.

The presence of noxious and non-native, invasive weeds (as defined by the State of Nevada in NAC 555.010) was identified within the areas of analysis from a number of sources. Noxious and non-native, invasive weeds were recorded during biological field surveys for vegetative communities and special status plants, as well as by the Tri-County Weed Program, Ely office and by existing BLM mapping programs. Tri-County Weed Program surveys were based on the assumption that the most likely places that weeds might become established are near transportation systems, in disturbed areas, and areas near water; therefore, survey efforts were focused in these areas. Tri-County used the following criteria to determine the geographical extent of their surveys:

- Scout all roads, trails, by-ways, railways, utility corridors, or other transportation systems.
- Scout all known seeps, springs, streams, dry streambeds, riparian systems, irrigation canals, stock ponds, or any wetlands.
- Scout any additional man-made or natural disturbed areas including, but not limited to, campgrounds, corral systems, mining disturbances, chainings, seismic exploration sites, material stockpiles, and any other disturbances.
- Identify all paths, routes, or ways traveled by inclusion within the GPS database library. These document places that were surveyed where no invasive plant populations were found.
- Additional areas may be specifically selected to survey based upon such issues as likely rare or endangered species presence, or for other management considerations.

Existing data from each of these sources was evaluated within the area of analysis described above, as well as a 1,000 ft. buffer surrounding the area of analysis, and combined with Project-specific biological field survey data to determine the number and location of noxious and non-native, invasive weeds within the project area. Noxious and non-native, invasive weed species locations were recorded during baseline data surveys for vegetative communities and wildlife, via pedestrian and windshield surveys. Noxious and non-native, invasive weed occurrences were recorded with a Trimble GeoXT global positioning system, and data was collected for each observation, including species type, location, approximate area/density of infestation, date and time of observation, and name of observer.

Special status plant species, including those listed on the Nevada BLM Sensitive Species list and in NAC 527.010 – List of fully protected species of native flora, were identified through field surveys within known habitat types in the areas of analysis. Vegetative communities were used to identify potential suitable habitat for threatened, endangered, and/or sensitive (TE&S) plant species within the areas of analysis described above, and field surveys conducted in spring and early summer 2007 focused on these areas.

3.7.3 Existing Conditions

3.7.3.1 Vegetation Communities/Cover Types

The following vegetative communities/cover types were mapped within the survey area, and they are described in detail below:

Wyoming Sagebrush	*Alkaline Meadow*
Creosote Bush	*Desert Playa*
Pinyon Juniper Woodland	*Shadscale*
Greasewood	*Dune*
Douglas Rabbitbrush	*Disturbed*
Joshua Tree	*Wetland*
Black Sagebrush	*Riparian*
Winterfat	*Basin Big Sagebrush*
Burn/Fire-Affected	*Agriculture/Pasture*
Blackbrush	*Mountain Big Sagebrush*
Salt Desert Shrub	*Open Water*
Rubber Rabbitbrush	*Limestone Outcrop*

Portions of the alkaline meadow, wetland, riparian, and open water communities may meet the criteria of jurisdictional waters of the U.S., including wetlands, subject to final verification by the Corps. Wetlands and Waters of the U.S. within the project area are discussed in detail in **Section 3.2**.

The following communities occur within the area of analysis, in order of prevalence within the project area limits. **Table 3.7-5** shows the acreage of each community type within the Proposed Action project elements, while **Table 3.7-6** shows the acreage of each community type within the Alternative Action project elements. **Figure 3.7-1** shows the locations of mapped vegetative communities throughout the project area within Steptoe Valley. Due to the length and expanse of the project area, only this map has been included. This figure (**Figure 3.7-1**) is focused on showing the locations of vegetation communities in the Steptoe Valley area from Lages Station to the north, down to the South Plant Site in the south, as the bulk of the project elements and alternatives would occur in this area. However, vegetation community mapping has been completed for the entire project area and a Baseline Vegetation Technical Report (JBR 2008a) that includes a complete set of vegetation community maps has been prepared and is included as part of the Project Record. JBR (2008a) also provides representative photographs of the most common vegetative communities found within the project area.

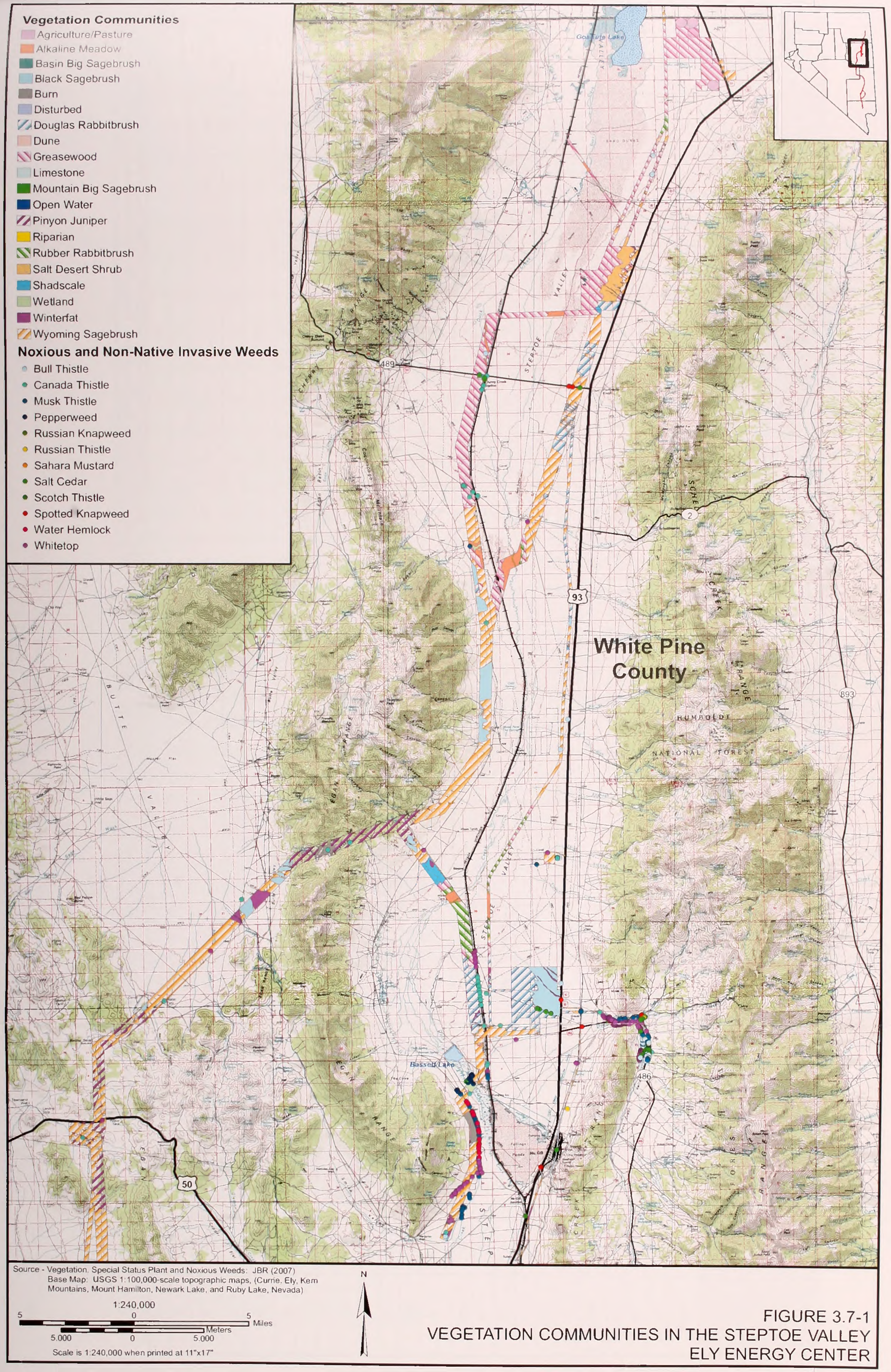


FIGURE 3.7-1
VEGETATION COMMUNITIES IN THE STEPTOE VALLEY
ELY ENERGY CENTER

TABLE 3.7-5. ACREAGE OF MAPPED VEGETATIVE COMMUNITIES WITHIN THE PROPOSED ACTION AREAS OF ANALYSIS

VEGETATIVE COMMUNITY AND/OR LAND TYPE	PROJECT ELEMENT																				
	SOUTH PLANT SITE	SOUTH PLANT SITE WORKER VILLAGE	MT. WHEELER LINE	ROBINSON SUMMIT SUB-STATION	HARRY ALLEN SUB-STATION	ELECTRIC TRANSMISSION LINE SEGMENTS											LAGES STATION WELL FIELD[1]	LAGES STATION WATER SUPPLY PIPELINE[2]	DUCK CREEK WATER SUPPLY PIPELINE (ALT)	RAIL LEAD	ALTERNATIVE RAIL LINE (ALT)[3]
						1D	3 (ALT)	4A	6C	8	9A (ALT)	9B	9C	9D	10 (ALT)	11					
Wyoming Sagebrush	0	162.8	224.5	707.9	0	3,214.4	1,671.3	775.9	16,650.2	2,965.6	0	0	0	0	0	0	91.1	982.9	77.0	33.0	1,318.2
Creosote Bush	0	0	0	0	31.9	0	0	0	0	0	0	0	387.7	6,601.6	2,354.3	13,010.4	0	0	0	0	0
Pinyon-Juniper	0	0	0	312.0	0	2,548.4	12.0	114.0	12,830.4	0	0	0	0	0	873.6	0	0	0	0.6	0	0
Greasewood	0	50.3	30.1	0	0	0	21.9	240.4	4,816.1	0	0	0	0	0	0	0	2,221.8	750.1	2.8	0	1,120.6
Douglas Rabbitbrush	1,586.0	0	17.1	0	0	0	27.1	1,149.5	136.8	8,262.2	0	0	50.1	0	0	0	0	642.5	79.5	121.4	758.8
Joshua Tree	0	0	0	0	0	0	0	0	0	7,134.6	0	374.3	0	0	566.8	0	0	0	0	0	0
Black Sagebrush	1,304.2	0	0.9	10.3	0	457.7	0	121.4	1,740.7	977.2	0	0	0	0	0	0	0	26.8	9.7	0	89.2
Winterfat	80.1	0	33.8	0	0	362.3	102.6	78.2	2,189.8	301.0	0	2,251.1	39.5	0	0	0	0	33.3	0	25.1	0
Burn/Fire-affected	0	0	0	0	0	182.4	324.3	0	0	0	433.1	0	0	0	1,626.8	335.3	0	0	0	0	0
Blackbrush	0	0	0	0	0	0	0	0	0	0	1,485.5	984.3	291.8	56.5	0	0	0	0	0	0	0
Salt Desert Shrub	0	0	20.6	0	0	0	0	0	0	0	0	0	0	0	125.7	0	0	34.8	35.2	0	436.9
Rubber Rabbitbrush	0	2.9	0	0	0	0	0	804.0	86.3	0	0	0	0	0	0	0	0	330.7	35.4	0	0
Alkaline Meadow	0	0	0	0	0	0	0	144.6	0	0	0	0	0	0	0	0	0	96.9	0.7	0	52.5
Desert Playa	0	0	0	0	0	0	0	0	0	0	0	455.9	0	0	0	71.85	0	0	0	0	0
Shadscale	0	0	0	0	0	0	0	338.5	0	0	0	0	0	0	0	0	0	19.3	0	0	0
Dune	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20.9	0	0	272.4
Disturbed	0	4.0	139.3	0	7.8	0.7	37.5	0	0	14.2	0	0	0	0	0	0	15.3	7.2	73.8	0	47.1
Wetland	0	0	0	0	0	0	96.3	7.3	0	0	0	0	0	0	0	0	0	0	20.5	0	0
Riparian	0	0	1.2	0	0	0	0	8.1	107.5	0	0	0	0	0	0	0	0	0	2.0	0	0
Basin Big Sagebrush	0	0	0	0.2	0	6.0	14.7	0.7	133.7	0	0	0	0	0	0	0	0	8.0	2.1	0	0
Agriculture/Pasture	0	0	2.3	0	0	0	3.5	0	0	0	0	0	0	0	0	0	494.6	0	22.4	0	0
Mountain Big Sagebrush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30.8	0	0
Open Water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.43	0	0
Limestone Outcrop	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.7	0	0

[1] Coyote Valley Ranch Well Field (Alt) is located within the South Plant Site Worker Village; Limited South (Alt), Middle (Alt), and South Well Fields (Alt) are located within the Lages Station Water Supply Pipeline corridor.
[2] Pipeline from Lages Station to South Plant Site; Coyote Valley Ranch, Limited South, Middle, and South Well Field water supply alternative pipelines would share the same corridor in varying lengths. See **Table 2.6-1** for specific pipeline corridor lengths.
[3] Includes only the Alternative Rail Line study area from Shafter to Lages Station and the rail-only corridor near the South Plant Site. The remainder of the Alternative Rail line is within the Lages Station Water Supply Pipeline corridor.

TABLE 3.7-6. ACREAGE OF MAPPED VEGETATIVE COMMUNITIES WITHIN THE ALTERNATIVE ACTION AREAS OF ANALYSIS

VEGETATIVE COMMUNITY AND/OR LAND TYPE	PROJECT ELEMENT																				
	NORTH PLANT SITE	NORTH PLANT SITE WORKER VILLAGE	MT. WHEELER LINE	ROBINSON SUMMIT SUB-STATION	HARRY ALLEN SUB-STATION	ELECTRIC TRANSMISSION LINE SEGMENTS												LAGES STATION WELL FIELD[1]	LAGES STATION WATER SUPPLY PIPELINE[2]	RAIL LEAD	ALTERNATIVE RAIL LINE (ALT)[4]
						1A (ALT)	1B	1C	1D	6C	8	9A (ALT)	9B	9C	9D	10 (ALT)	11				
Wyoming Sagebrush	279.4	148.3				2,640.7	1,175.0	2,403.6												5.1	1,385.6
Creosote Bush	0	0				0	0	0												0	0
Pinyon-Juniper	0	0				0	0	386.4												0	0
Greasewood	1,606.3	0				574.1	3,380.1	0												238.3	1,500.3
Douglas Rabbitbrush	204.1	0				994.1	38.8	0												0	647.7
Joshua Tree	0	0				0	0	0												0	0
Black Sagebrush	0	0				0	261.1	748.2												0	89.2
Winterfat	9.2	0				0	0	0												0	39.8
Burn/Fire-affected	0	0				0	0	0												0	0
Blackbrush	0	0				0	0	0												0	0
Salt Desert Shrub	832.8	0				0	0	0												0	436.9
Rubber Rabbitbrush	0	0	SAME AS PROPOSED ACTION	SAME AS PROPOSED ACTION	SAME AS PROPOSED ACTION	63.4	13.1	0	SAME AS PROPOSED ACTION									SAME AS PROPOSED ACTION	SAME AS PROPOSED ACTION[3]	34.6	41.5
Alkaline Meadow	0	0				380.6	341.5	0												35.9	52.5
Desert Playa	0	0				0	0	0												0	0
Shadscale	17.9	0				0.5	17.7	0												0	0
Dune	0	0				0	0	0												0	283.4
Disturbed	0	1.2				0	5.3	20.1												0	47.1
Wetland	0	0				0	38.1	0												0	0
Riparian	0	0				11.4	0	0												0	0
Basin Big Sagebrush	19.7	0				2.6	0	0												0	0
Agriculture/Pasture	0	0				0	0	0												0	0
Mountain Big Sagebrush	0	0				0	0	0												0	0
Open Water	0	0				0	0	0												0	0
Limestone Outcrop	0	0				0	0	0												0	0

[1] Coyote Valley Ranch Well Field (Alt) is located partially within the South Plant Site Worker Village (**Table 3.7-5**); Limited South (Alt), Middle (Alt), and South Well Fields (Alt) are located within the Lages Station Water Supply Pipeline corridor (**Table 3.7-5**).
[2] Coyote Valley Ranch (Alt), North (Alt), Middle (Alt), and South Well Field (Alt) water supply pipelines are located within the same corridor and contain the same vegetation types.
[3] This corridor is the same for all water supply alternatives. Specific impacts to vegetative communities, by alternative, are discussed in **Section 4.7**.
[4] Includes the Alternative Rail line study area from Shafter to the North Plant Site only.

Wyoming Sagebrush Community

The Wyoming sagebrush (*Artemisia tridentata* var. *wyomingensis*) community is found on 24 percent of the land within the project area. It occurs on shallow, stony soils of alluvial fan skirts and piedmonts, and concave side slopes of mountains. It is found throughout the northern two-thirds of the project area, from Shafter in Elko County south, through Goshute, Steptoe, Butte, and White River Valleys, and through parts of the Egan, Grant, and Schell Creek Ranges, with the southernmost occurrence in Dry Lake Valley, in northern Lincoln County. Variations of this community type include both a low species diversity, monoculture aspect with a sparse to nonexistent herbaceous understory cover, and a Wyoming sagebrush dominated shrub community that includes Douglas rabbitbrush (*Chrysothamnus viscidiflorus*), black sagebrush (*Artemisia nova*), and Nevada ephedra (*Ephedra nevadensis*) as common associates. Dominant grass species include Indian ricegrass (*Achnatherum hymenoides*), Thurber's needlegrass (*Achnatherum thurberianum*), Sandberg's bluegrass (*Poa secunda*) and bottlebrush squirreltail (*Elymus elemoides*). Two cactus species are fairly common and include Simpson's hedgehog cactus (*Pediocactus simpsonii*) at higher elevations in the Egan Range, and a pricklypear (*Opuntia* spp.) found throughout the project area. Matted buckwheat (*Eriogonum cespitosum*) is also a common groundcover at higher elevations. Forbs include Douglas' pincushion (*Chaenactis douglasii*), phlox (*Phlox* spp.), and globemallow (*Sphaeralcea* spp.). On the west side of Steptoe Valley and within the Egan Range, this community type is characterized by encroaching pinyon-juniper, with the Utah juniper (*Juniperus osteosperma*) more prevalent than the singleleaf pinyon (*Pinus monophylla*). Other variations of this community type include those with codominants in the shrub layer: Wyoming sagebrush-Douglas rabbitbrush, Wyoming sagebrush-black sagebrush and Wyoming sagebrush-big sagebrush (*Artemisia tridentata* var. *tridentata*) community types. Alterations to this community include a small seeding of Great Basin wildrye (*Elymus cinereus*) in Steptoe Valley east of the Steptoe Slough and adjacent to the Dam Road.

Creosote Bush Community

The creosote bush (*Larrea tridentata*) community is found on 16 percent of the land within the area of analysis. It was mapped in the southern extent of the project area within portions of the SWIP Corridor and alternative transmission line corridors, in southern Lincoln and northern Clark Counties, within Delamar, Kane Springs, and Coyote Spring valleys. This community is typically open and sparse, with an abundance of dry, gravelly, bare soil between plants. Occasional spring ephemeral herbaceous growth may occur, including forbs and graminoids.

Pinyon-Juniper Woodland Community

The singleleaf pinyon–Utah juniper community is found on 13 percent of the land within the area of analysis. It occurs primarily in mountainous regions, at elevations higher than 6,500 feet amsl (1,970 m). It was observed in the Egan, Grant, Schell Creek, and Delamar Ranges. Upper mountain slopes and ridgelines generally support older, denser stands of pinyon-juniper, while mid and lower slopes represent more recent incursions into the adjacent sagebrush dominated community types. The shrub understory is composed variously of mountain sagebrush (*Artemisia tridentata* var. *vaseyana*) present on the deeper soils of concave slopes, with black and Wyoming sagebrush occurring on shallower, stony soils. Other common shrubs include Douglas rabbitbrush, bitterbrush (*Purshia tridentata*), Utah serviceberry (*Amelanchier utahensis*), and Mormon tea (*Ephedra viridis*). The understory is sparse compared to the adjacent sagebrush dominated community types. Common grasses include bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg's bluegrass, and Thurber's needlegrass. Characteristic forbs include crag aster (*Aster scopularum*), cushion daisy (*Erigeron compactus*),

basin butterweed (*Senecio multilobatus*), white stoneseed (*Lithospermum ruderale*), rockcress species (*Arabis* spp.), thickstem wild cabbage (*Caulanthus crassicaulis*), and *Phlox* species.

Greasewood Community

The greasewood (*Sarcobatus vermiculatus*) community is found on 11 percent of the land within the area of analysis and occurs mostly on alluvial flats exhibiting poorly drained soils. Greasewood tolerates the high salt and sodic attributes of these seasonally ponded soils. It was observed throughout much of Goshute and Steptoe valleys, and in portions of the White River Valley. On the lowest portion of the alluvial fan, low species diversity characterizes this community type with shadscale (*Atriplex confertifolia*), spiny horsebrush (*Tetradymia spinosa*) and herb Sophia (*Descurainia ophia*) as common associates. Descending to the valley floor, the greasewood community is characterized by the presence of a mixed greasewood-rabbitbrush (*Chrysothamnus teretifolius* and *C. nauseosus* ssp. *consimilis*) dominated plant community. Soils exhibit a salty crust and inland saltgrass (*Distichlis spicata*) is common in the herbaceous layer along with other members of the goosefoot (*Chenopodiaceae*) family. On the valley floor, this community is characterized by flocculated soils and large, mostly bare soil interspaces, the mounds vegetated with greasewood and few herbaceous species.

Douglas Rabbitbrush Community

The Douglas rabbitbrush community is found on 10 percent of the land within the area of analysis. It was mapped in parts of Goshute, Steptoe, and Dry Lake valleys. This community is characterized by the presence of cryptogrammic crust with gravel and cobble ground cover, and a sparse herbaceous layer. Common to occasional shrub associates include winterfat (*Krascheninnikovia lanata*) and bud sagebrush (*Artemisia spinescens*). The herbaceous understory is variously dominated by several grasses including bottlebrush squirreltail and Indian ricegrass, with Sandberg bluegrass and needle and thread grass (*Achnatherum comata*) also present. Additional, common herbaceous species include herb sophia. Another variation is the mixed Douglas rabbitbrush-green molly (*Kochia americana*) community found at the south end of Steptoe Valley on the valley floor.

Joshua Tree Community

The Joshua tree (*Yucca brevifolia*) community is found on 6 percent of the land within the area of analysis. It was observed in the Delamar Valley, in the central portion of Lincoln County. This community possesses the Joshua tree as its highest stratum, although individuals are typically sparsely spread across the landscape. Common shrub associates included bursage (*Ambrosia dumosa*), broom snakeweed (*Gutierrezia sarothrae*), and horsebrush, with limited herbaceous growth.

Black Sagebrush Community

The black sagebrush community is found on 4 percent of the land within the area of analysis. It was mapped in the central portion of the project area, from southern Elko County to northern Lincoln County, on the Steptoe, Butte, White River, and Dry Lake valley margins. Black sagebrush is generally found in areas with shallow, rocky soils on alluvial fans and piedmonts, often derived from limestone. Characteristic shrub associates include bud sagebrush, Douglas rabbitbrush, winterfat, broom snakeweed, and green molly. Grasses found with black sagebrush included Sandberg's bluegrass, Indian ricegrass, Thurber's needlegrass, and bottlebrush squirreltail. Forbs include wild buckwheat (*Eriogonum* spp.) species, pincushion (*Chaenactis* spp.), rockcress, herb sophia, and milkvetch (*Astragalus* spp.) species.

Winterfat Community

The winterfat community is found on 4 percent of the land within the area of analysis on alluvial flats and lake plains that are fairly well-drained. Although not present in large expanses,

winterfat was widely spread throughout the project area, from as far north as central Elko County south to southern Lincoln County, within the valley flats. This community type is characterized by a mound-intermound micro topography with mounds hosting both the shrub and herbaceous cover, and the intermound areas exhibiting mostly bare soil with some gravel present. It also occurs as small inclusions within the Wyoming sagebrush, black sagebrush, and Douglas rabbitbrush communities. Winterfat provides the bulk of the shrub cover, with Indian ricegrass as the dominant in the herbaceous understory. Additional common herbaceous species include herb sophia and bottlebrush squirreltail. Variations include the winterfat-bud sagebrush community in the north Steptoe Valley. Winterfat and bud sagebrush provide codominant shrub cover with shadscale occasionally present as well. The disturbed winterfat community in south Steptoe Valley is characterized by herb sophia as a common herbaceous associate, and Wyoming sagebrush is present as an occasional shrub.

Burn/Fire-Affected Community

The burn/fire-affected community is found on 2 percent of the land within the area of analysis. Burn/fire-affected communities were observed in small areas on the eastern and western slopes of the Egan Range in central White Pine County, within the Delamar Range, Kane Springs Valley, and Delamar Lake areas of southern Lincoln County, and within Hidden Valley in Clark County. The Robinson Summit area burn is characterized by native shrubs colonizing the slopes of the burn. These species include green molly, rubber rabbitbrush (*Chrysothamnus nauseousus*), Wyoming and mountain sagebrush, and herbaceous species including bluebunch wheatgrass (*Pseudoregnaria spicata*) and Great Basin wildrye. The crest of the summit predominantly exhibits noxious and non-native, invasive plant species including cheatgrass and Russian thistle (*Salsola kali*), and thorn skeletonweed (*Pleiacanthus spinosus*) as a native ruderal plant. A few relict elderberry (*Sambucus* spp.) bushes are present near the summit recovering from the burn. The burn area north of Hercules Gap on the alluvial fan of the Egan Range is dominated by weedy plant species including Russian thistle, cheatgrass, and herb sophia. Common seeded species include crested wheatgrass (*Agropyron cristatum*) and fourwing saltbush (*Atriplex canescens*), while colonizing natives include Wyoming sagebrush, and forbs globemallow (*Sphaeralcea* spp.) and prickly poppy (*Argemone munita*). The burn areas in Lincoln and Clark Counties are recent, with little more than the charred remains of a former pinyon-juniper community, as well as a creosote bush community. Primary succession in the form of small forbs and herbaceous growth was observed in the early summer 2007 field surveys.

Blackbrush Community

The blackbrush (*Coleogyne ramosissima*) community is found on 2 percent of the land within the area of analysis. It occurs exclusively in southern Lincoln County, on the slopes of the Delamar Range. This community typically occurs upslope, or in more hilly conditions, than the creosote bush community, although not as high as the pinyon-juniper woodland community. Shrub coverage can be as much as 90-95 percent (Shreve 1942), and only sparse brome (*Bromus* spp.) herbaceous cover was observed in this community within the area of analysis.

Salt Desert Shrub Community

Salt desert shrub communities are found throughout Steptoe Valley and are characterized by alkaline and/or drought tolerant species. This community is found on 1 percent of the land within the area of analysis. This community occurs in Goshute and Steptoe valleys, and in one location in southern Lincoln County within Kane Springs Valley. Shrub species dominance is variable; therefore the community is called by its collective name. Shadscale and greasewood provide consistent shrub cover throughout this community while fourwing saltbush, assorted

horsebrushes, spiny hopsage (*Grayia spinosa*), bud sagebrush, green molly, and winterfat are variably dominant or present. Common forbs include wild buckwheats, milkvetches, globemallow, herb sophia, and penstemon (*Penstemon* spp.). Grasses include Indian ricegrass, bottlebrush squirreltail, and Sandberg's bluegrass.

Rubber Rabbitbrush Community

The rubber rabbitbrush community is found on 1 percent of the land within the area of analysis. Rubber rabbitbrush was observed in Steptoe and Duck Creek valleys in central White Pine County, generally associated with the floodplain of the Duck Creek drainage. This community tended to be a monotypic shrub community, with occasional pockets of greasewood and Wyoming sagebrush interspersed. Soils are alkaline and soft, with moderate to poor drainage. Varying densities of graminoids were present in the herbaceous stratum, from less than 5 percent to nearly 100 percent coverage. Species include inland saltgrass, sedges (*Carex* spp.), arrowgrass (*Triglochin maritima*), alkali grass (*Puccinelia* sp.), and alkali cordgrass (*Spartina gracilis*).

Alkaline Meadow Community

The alkaline meadow community is found on 0.8 percent of the land within the area of analysis. The community was mapped throughout central Steptoe Valley, within and adjacent to the Duck Creek drainage. One other location was observed in Goshute Valley, in southern Elko County. The seasonally moist to wet, alkaline meadow is characterized by high species diversity and is dominated by graminoids. These include Great basin wildrye near the margins, and inland saltgrass, rushes (*Juncus* spp.), sedges, arrowgrass (*Triglochin maritima*), alkali grass, alkali cordgrass, and alkali bluegrass (*Poa secunda* spp. *juncifolia*) variably present throughout the meadow. Common forbs include sumpweed (*Iva axillaris*), King's ivesia (*Ivesia kingii*), annual and perennial members of the goosefoot family, and members of the aster (*Asteraceae*) family. The Eurasian forb, fivehorn smotherweed (*Bassia hyssopifolia*), is also common. Elk thistle (*Cirsium scariosum*) is also present within this community.

Agriculture/Pasture Lands

Agricultural lands are found on 0.4 percent of the land within the area of analysis, typically on private land. Agricultural lands are privately held and include irrigated hay meadows, alfalfa fields, wheat fields or other crops, and livestock pasture and pens. These lands were observed in the Duck Creek Valley and in northern Steptoe Valley.

Desert Playa

The desert playa land type is an unvegetated expanse occurring at two locations within the southern extent of the SWIP Corridor. Desert playa is the lowest part of an intermountain basin or bolson, which is frequently flooded by run-off from the adjacent highlands or by local rainfall. The surface is generally flat, with mud flats and locally small dunes (Allaby 1994). It was found on 0.4 percent of the land within the area of analysis and was mapped at Delamar Lake in Lincoln County and Dry Lake in Clark County.

Shadscale Community

The shadscale community is found on 0.3 percent of the land within the area of analysis. It was observed in Steptoe Valley, in central White Pine County. This community exhibits mound-intermound microtopography. Vegetation is relegated to the mounds for the most part, with the interspaces featuring cryptogramic crust and bare soil. Unique to this community, alkali grass occurs as well as other grasses including Indian ricegrass and bottlebrush squirreltail. Shadscale provides almost monoculture shrub cover with greasewood occasionally present in the shrub layer. The sparse herbaceous layer in this community type contains herb sophia.

Dune Community

Another community variation occurs on stabilized dunes vegetated by the greasewood-iodinebush (*Allenrolfea occidentalis*) community type, with iodinebush a codominant and various species of rabbitbrush occasionally present. The stabilized dunes vegetation community is found on 0.2 percent of the land within the area of analysis. Soils are flocculated on the dunes and the large interspaces exhibit clay soils and sparse occurrences of slender glasswort (*Salicornia europaea*) and inland saltgrass. This community was mapped in northern Steptoe and southern/central Goshute Valleys.

Disturbed Lands

Disturbed lands are found on 0.3 percent of the land within the area of analysis, occurring in and around developed areas in Elko, White Pine, Lincoln, and Clark Counties. This classification includes roads, gravel pits, buildings, parking lots and similar human-caused disturbances. The burn/fire-affected, agriculture/pasture, and disturbed categories may include some vegetation component that is considered ruderal (e.g. herb sophia, tumble mustard).

The potential for noxious and non-native, invasive weeds occurs along the unpaved roads present within the project area, and the areas disturbed as a result of power line installations, staging areas, excavations and grazing allotments. Invasive species including cheatgrass and halogeton (*Halogeoton glomeratus*) are present providing sparse to dense cover within all community types, probably reflecting past livestock grazing history. In particular, the southern Steptoe Valley community types reflect this condition. Both paved and dirt road shoulders support Russian thistle and cheatgrass, with curlycup gumweed (*Grindelia squarrosa*) a common ruderal species.

While not mapped as a separate community type, power line easements and reclaimed roads have been revegetated with crested wheat grass, common yarrow (*Achillea millefolium*), and flax (*Linum lewisii*) in the Egan Range. Native plant species colonizing these easements include Wyoming and mountain sagebrush, Douglas rabbitbrush, and bottlebrush squirreltail.

Riparian Community

The riparian community is found on 0.1 percent of the land within the area of analysis and may or may not be Jurisdictional Wetlands. It was mapped along larger drainages associated with Duck Creek and White River in White Pine County, and White River in Nye County. Thickets of Wood's rose (*Rosa woodsii*) line the stream draining east to Steptoe Valley. Salt cedar (*Tamarix* spp.) is found on the margins of the Steptoe Slough and as isolated clumps within the emergent wetland at the slough. In Duck Creek, sand bar willow is found along the creek and around the dam and irrigation ditches.

Wetland Community

The wetland community is found on 0.1 percent of the land within the area of analysis, in Steptoe and Duck Creek Valleys. This community is characterized as narrow stringers adjacent to perennial and ephemeral streams, and ponds, and also occurs as larger map units (e.g. at the Steptoe Slough). This vegetation community does not include alkali-affected wetlands, which is described as a separate vegetation community, or the riparian community. In more hydrophytic areas, the wetland community is emergent variously vegetated with broad leaf cattail (*Typha latifolia*), softstem bulrush (*Scirpus validus*), common threesquare (*S. pungens*), rushes and sedges. Common herbaceous species include water parsnip (*Berula erecta*) and willow herb (*Epilobium ciliatum*). A wetlands and Waters of the U. S. delineation was conducted for the area of analysis during baseline data collection activities. A summary of that delineation is found in **Section 3.2.3.3** and a detailed delineation report is included in the project record

(JBR 2007a). In several instances, individual delineated wetland areas were small (i.e., less than 0.5 acres) and are not shown as separate vegetative community units at their respective locations. Rather, they have been treated as inclusions within the dominant surrounding community.

Basin Big Sagebrush Community

The basin big sagebrush community is found on 0.1 percent of the land within the area of analysis where deep, well-drained soils are present. This community type occurs as a stringer community type adjacent to both perennial streams and adjacent to and within ephemeral drainages in valleys, fans, and lower mountain slopes. It is also present as larger map units on valley bottoms. It was mapped at locations in Steptoe and Butte valleys. Characteristic species include greasewood and rubber rabbitbrush as common shrub associates, with bitterbrush occasionally present at higher elevation valley bottoms. Common grass associates include Great Basin wildrye, Sandberg's bluegrass, and Indian ricegrass. Forbs include ragwort species (*Senecio* spp.), pincushion, milkvetch species, herb sophia, and roughseed cryptantha (*Cryptantha flavoculata*). As one approaches the Steptoe Slough from the east (within transmission line Segment 3), the big sagebrush community is highly impacted by livestock and transitions to a disturbed community dominated by threadleaf rubber rabbitbrush and herb sophia.

Mountain Big Sagebrush Community

The mountain big sagebrush community is found on less than 0.1 percent of the land within the area of analysis on mountain slopes where deeper, well-drained soils are present. Mountain big sagebrush was mapped in the Duck Creek Valley. Shrubs associated with mountain sagebrush include bitterbrush, mountain snowberry (*Symphoricarpos oreophilus*), black sagebrush, and Wyoming sagebrush. Forbs include milkvetch species, Hood's phlox (*Phlox hoodii*), cushion daisy (*Erigeron compactus*), and white stoneseed (*Lithiosperma ruderale*). Grasses include bottlebrush squirreltail, Indian rice grass, bluebunch wheatgrass, and Sandberg's bluegrass.

Open Water

Open water was associated with created impoundments located in the Duck Creek Valley. These impoundments currently serve to provide water to the Kennecott Copper Company facility in McGill and are associated with one of the water supply alternatives. Open water encompasses less than 0.1 percent of the land within the area of analysis.

Limestone Outcrop Unique Vegetation

Limestone outcrop is found on less than 0.1 percent of the land within the area of analysis. A small area of this type was found in the Duck Creek Valley at about 6,600 feet (2,020 m) amsl. This unique substrate supports many Nevada plant endemics, with Pennel's draba (*Draba pennelii*), known to occur in White Pine County. Simpson's hedgehog and pricklypear cactus species are also present. Common forbs include mat rockspirea (*Petrophyton caespitosum*), cryptantha, milkvetch, globemallow, and penstemon. Grasses include bluebunch wheatgrass, Sandberg's bluegrass, Indian ricegrass, and bottlebrush squirreltail.

3.7.3.2 Noxious and Non-Native, Invasive Weeds

The BLM defines an invasive weed as "a non-native plant that disrupts or has the potential to disrupt or alter the natural ecosystem function, composition and diversity of the site it occupies. Its presence deteriorates the health of the site, it makes efficient use of natural resources difficult and it may interfere with management objectives for that site. It is an invasive species that requires a concerted effort (manpower and resources) to remove from its current location, if it can be removed at all" (BLM National List of Invasive Weed Species of Concern). They have

the ability to readily establish and spread rapidly, particularly in disturbed areas, and may cause damage to agriculture, range resources, and forestry, as well as increase fire susceptibility. Nevada BLM defines "noxious" weeds as those plant species "that interfere with management objectives for a given area of land at a given point in time" (http://www.nv.blm.gov/Resources/noxious_weeds.htm). Noxious and non-native, invasive weeds considered for effect under this study include:

- Plant species listed or considered as federal noxious weeds by the United States Department of Agriculture
- Plant species listed as noxious by the State of Nevada per NAC 555.010
- Plant species considered invasive weed species of concern to the BLM

Regulatory Framework

Federal Executive Order 13112, *Prevention and Control of Invasive Species* (3 February 1999), defines invasive species as "alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health." This order requires any federal agency whose action may affect the status of invasive species to undertake reasonable and appropriate measures to prevent or minimize the spread of invasive species, and to monitor and manage their conditions. A number of additional federal laws address identification, treatment, and monitoring of invasive species, including the following:

- Lacey Act as amended (18 U.S.C. 42)
- Nuisance Prevention and Control Act of 1990 as amended (16 U.S.C. 4701 et. seq.)
- Federal Noxious Weed Act of 1974 as amended by the Food, Agriculture, Conservation and Trade Act of 1990 (Section 1453 "Management of Undesirable Plants on Federal Lands" U.S.C. 2801 et. seq.)
- Federal Plant Pest Act (7 U.S.C. 150aa et. seq.)
- Carlson-Fogey Act of 1968 (Public Law 90-583)
- Salt Cedar and Russian Olive Control Demonstration Act (Public Law 109-320)
- Safe, Accountable, Flexible, Efficient Transportation Equity Act (Public Law 109-59)
- Noxious Weed Control and Eradication Act (Public Law 108-412)

In addition to federal regulations, the State of Nevada Department of Agriculture serves to regulate noxious and non-native, invasive weed presence. According to NAC 555.010, it is the responsibility of the landowner, both public and private, to manage and control listed noxious species. The U.S. Department of Agriculture's Federal Noxious Weed List, State Noxious Weed List, and BLM Invasive Weed Species of Concern List are provided in **Appendix 3A**.

Noxious and Non-Native, Invasive Weed Occurrence

Noxious and non-native, invasive weeds were observed throughout the area of analysis with the majority of occurrences in central Steptoe Valley on, or adjacent to, roads and fence lines. **Table 3.7-7** shows the noxious and non-native, invasive weed species which were identified through existing data and field observations within the area of analysis. **Figure 3.7-1** shows the locations of known and/or observed noxious and non-native, invasive weed occurrences within 1,000 feet of the areas of analysis for areas in Steptoe Valley. JBR (2008a) provides maps of known noxious and non-native, invasive weed occurrences and observations for the entire project area.

TABLE 3.7-7. NOXIOUS AND NON-NATIVE, INVASIVE WEEDS OBSERVED WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	NUMBER OF OBSERVATONS	COUNTY OF PROJECT ELEMENT/OBSERVATION
Bull Thistle	*Cirsium vulgare*	72	White Pine
Canada Thistle	*Cirsium arvense*	60	White Pine, Lincoln
RED BROME	*Bromus Rubens*	N/A*	Lincoln, Clark
Cheatgrass	*Bromus tectorum*	N/A*	Elko, White Pine, Lincoln, Clark
Halogeton	*Halogeton glomeratus*	N/A*	Elko, White Pine, Lincoln, Clark
Musk Thistle	*Carduus nutans*	66	White Pine, Lincoln
Perennial Pepperweed	*Lepidium latifolium*	10	White Pine
Russian Knapweed	*Acroptilon repens*	10	White Pine
Russian Thistle	*Salsola iberica*	10	White Pine
Sahara Mustard	*Brassica tournefortii*	9	Clark
Salt Cedar (Tamarisk)	*Tamarisk* spp.	43	White Pine, Lincoln
Scotch Thistle	*Onopordum acanthium*	2	White Pine
Spotted Knapweed	*Centaurea stoebe*	20	White Pine, Lincoln
Squarrose Knapweed	*Centaurea virgata lam.*var. *squarrose*	4	White Pine
Water Hemlock	*Cicuta douglasii*	14	White Pine
Whitetop	*Lepidium draba*	208	White Pine, Nye, Lincoln, Clark

*Due to the frequency of these species, they were not mapped in detail

<u>*Whitetop*</u>

The most common noxious and non-native, invasive weed known and/or observed within the area of analysis was whitetop (*Lepidium draba*). Whitetop was observed in White Pine, Nye, Lincoln, and Clark Counties within or immediately adjacent to (within 1,000 ft. of), the following project elements:

- South Plant Site Worker Village
- Mt. Wheeler Power Line
- Duck Creek Water Supply Line
- Segment 1A
- Segment 1D
- Segment 3
- Segment 4A
- Segment 6C
- Segment 9D
- Segment 11

Bull Thistle, Canada Thistle, Musk Thistle

Also widely spread were bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), and musk thistle (*Carduus nutans*). Thistles were observed in Elko, White Pine, and Lincoln counties with the largest presence in Steptoe and Duck Creek Valleys.

Bull thistle, Canada thistle, and musk thistle were observed in the following project elements:

- Duck Creek Water Supply Line
- Segment 3

Bull thistle and Canada thistle were also observed in the following project elements:

- South Plant Site Worker Village
- Segment 1B

Bull thistle was also observed in the following project elements:

- South Plant Site
- Lages Station Water Supply Line

Canada thistle was also observed in the following project elements:

- Robinson Summit Substation
- South Plant Site Rail Lead
- Segment 1D
- Segment 6C
- Segment 11

Musk thistle was also observed at the following project elements:

- Segment 8

Salt Cedar

Salt cedar (*Tamarisk* spp.) was observed within the South Plant Site, and in and around drainages throughout White Pine County and in southern Lincoln County within the following project elements:

- Duck Creek Water Supply Line
- South Plant Site
- Mt. Wheeler Transmission Line
- Segment 1A
- Segment 1B
- Segment 3
- Segment 6C
- Segment 9D
- Segment 10

Salt cedar has infested the desert southwest, mostly along waterways and in arroyos with ephemeral flows, interrupting natural habitats. It is well adapted to alkaline and salty soils, heat and cold, and windy sites. Its aggressive, deep root system uses much ground water, often to

the detriment of other species. In many sites, it forms a pure stand that is almost impenetrable. Few to no plants grow under its canopy because of the high concentrations of salt that builds up in the soil from its accumulated leaf litter and the excretion of salt from glands on the leaves.

Other Noxious and Non-Native, Invasive Weeds

Eight other noxious and non-native, invasive weeds were observed with occurrences totaling 20 or less per species.

Spotted knapweed (*Centaurea stoebe*), perennial pepperweed (*Lepidium latifolium*), Russian thistle (*Salsola iberica*), and squarrose knapweed (*Centaurea virgata Lam. var squarrose*) were all observed within the Duck Creek Water Supply Line area. Spotted knapweed, water hemlock (*Cicuta douglasii*), perennial pepperweed, and Russian knapweed (*Acroptilon repens*) were observed in Segment 3. Spotted knapweed and Scotch thistle (*Onopordum acanthium*) were both observed within the Mt. Wheeler Transmission Line and Segment 6C. Additionally, spotted knapweed was observed on the South Plant Site and within Segments 1A, 8, 9D, and 10, and Russian thistle was observed within the Mt. Wheeler Transmission Line corridor. Sahara mustard (*Brassica tournefortii*) was observed in Segment 11.

While not occurring on the Nevada Department of Agriculture Noxious Weed List, the U. S. Department of Agriculture now considers cheatgrass (a.k.a. downy brome [*Bromus tectorum*]) a severe weed in several agricultural systems in North America, particularly pastureland, western rangeland, and winter wheat fields (Young and Clements 2007). Cheatgrass is also listed by the BLM as an Invasive Weed Species of Concern (**Appendix 3A**). This species is an aggressive invader of sagebrush, pinyon-juniper, and other shrub communities, where it can out-compete native grasses and shrubs (Young and Clements 2007). Cheatgrass depletes soil moisture and is highly flammable in late spring and early summer (Young and Clements 2007). While not mapped in detail, cheatgrass was observed in small (less than 0.5 acre.) inclusions throughout the areas of analysis in natural communities, as well as in larger (greater than 0.5 acre.) pockets of disturbed areas. Cheatgrass was most commonly observed within or nearby agricultural areas and pastureland (current or former) and disturbed land.

Halogeton is also not present on the Nevada list, but is listed by the BLM as an Invasive Weed Species of Concern (**Appendix 3A**). Halogeton is a common invasive in upland shadscale and saltbush communities throughout the Great Basin, introduced to Nevada in the 1930s (Nachlinger et al. 2001). Halogeton, like cheatgrass, was not mapped in detail, but was observed in small patches throughout the area of analysis, most commonly associated with areas of prior disturbance such as agricultural land, road banks, existing transmission line corridors, and range watering stations.

3.7.3.3 Special Status Plant Species

Specific field surveys for TE&S plant species were conducted on May 21 through May 29, 2007—the ideal time period within the growing season to observe and correctly identify most sensitive plants. The area from Steptoe Valley south to the Robinson Summit Substation was surveyed in detail. The 160-mile SWIP Corridor south of Robinson Summit was surveyed at a reconnaissance level.

Prior to the survey, a list of target species was developed from the Nevada BLM Sensitive Species list and from NAC 527.010 – List of fully protected species of native flora. **Table 3.7-8** lists target species selected because their potential habitat occurs within the area of analysis. Target species, their habitats, and findings of the field survey are described below.

TABLE 3.7-8. TARGET SPECIES WITHIN THE AREA OF ANALYSIS - STEPTOE VALLEY TO ROBINSON SUMMIT SUBSTATION

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS
White bear poppy	*Arctomecon merriamii*	BLM Sensitive	
Eastwood milkweed	*Asclepias eastwoodiana*	BLM Sensitive	
Threecorner milkvetch	*Astragalus geyeri var. triquetrus*		NAC 527.010
Monte Neva paintbrush	*Castilleja salsuginosa*		NAC 527.010
White River catseye	*Cryptantha welshii*	BLM Sensitive	
Las Vegas buckwheat	*Eriogonum corymbosum var. nilesii*	BLM Sensitive	
Sunnyside green gentian	*Frasera gypsicola*		NAC 527.010
Tiehm's blazing star	*Mentzelia tiehmii*	BLM Sensitive	
Tunnel Springs beardtongue	*Penstemon concinnus*	BLM Sensitive	
Lahontan beardtongue	*Penstemon palmeri* var. *micranthus*	BLM Sensitive	
Parish phacelia	*Phacelia parishii*	BLM Sensitive	
Ute ladies-tresses orchid	*Spiranthes diluvialus*	Threatened	NAC 527.010

Source: Nevada BLM Sensitive Species List: NAC 527.010

Target Species and Habitats

The following species were identified as potentially occurring in habitats found within the area of analysis:

- White bearpoppy (*Arctomecon merriamii*) is known in Clark, Lincoln, and Nye Counties, Nevada, as well as in California. An evergreen perennial herb, it occurs on alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops.
- Eastwood milkweed (*Asclepias eastwoodiana*) is endemic to Esmeralda, Lander, Lincoln, and Nye Counties, Nevada. A late-spring flowering perennial herb, it occurs in open areas on basic (pH 8 or higher) soils, frequently in small washes or other moisture-accumulating microsites.
- Threecorner milkvetch (*Astragalus geyeri* var. *triquetrus*) is known in Clark and Lincoln Counties, Nevada, as well as in Arizona. It occurs on open, deep sandy soil or dunes, generally stabilized by vegetation and or a gravel veneer. It is dependant on sand dunes or deep sand in Nevada.
- Monte Neva paintbrush (*Castilleja salsuginosa*) is endemic to Nevada, known from only two occurrences at Hot Springs Hill in Kobeh Valley, Eureka County; and Monte Neva Hot Springs in Steptoe Valley, White Pine County. It grows in moist areas along the drainages discharging from the hot springs.
- White River catseye (*Cryptantha welshii*) is endemic to Nevada known from Nye, Lincoln, and White Pine Counties. It occurs on calcareous soils in barren areas and open desert pavement within the black sagebrush community. The nearest occurrence to the project area is at Jakes Wash located approximately 15 miles south of Ely.
- Las Vegas buckwheat (*Eriogonum corymbosum* var. *nilesii*) is known in Clark County, Nevada. Growing from 1,900 to 3,900 ft. amsl, it occurs on and near gypsum soils, often forming low mounds or outcrops in washes and drainages, or in areas of generally low relief.

- Sunnyside green gentian (*Frasera gypsicola*) is known from Nye and White Pine Counties in Nevada, and possibly in Utah. It occurs on dry, salt-crusted, and spongy silty clay soils of calcareous flats and barrens with low to no gypsum content.
- Tiehm's blazing star (*Mentzelia tiehmii*) is endemic to the White River Valley, in northeastern Nye and Lincoln Counties, Nevada near Sunnyside Reservoir. It occurs primarily on hill tops of white soil and rock outcrops, with sparsely-vegetated black sagebrush, Parry's rabbitbrush, and/or shadscale saltbush communities.
- Tunnel Springs beardtongue (*Penstemon concinnus*) is known from White Pine County, Nevada; and from Beaver and Millard Counties, Utah. The Nevada location is in Snake Creek on the east side of the Snake Range.
- Lahontan beardtongue (*Penstemon palmeri* var. *macranthus*) is a robust perennial herb found in the west central part of Nevada. It grows along washes, roadsides, and canyon floors, particularly on carbonate-containing substrates, usually where subsurface moisture is available throughout most of the year.
- Parish phacelia (*Phacelia parishii*) is known from White Pine and Nye Counties, Nevada; and from San Bernardino County, California. The closest known location is in Spring Valley between the Schell Creek and Snake Ranges. It occurs on playas and in moist alkali meadows on the valley floor.
- Ute ladies tresses (*Spiranthes diluvialus*), a federally threatened species, is known to occur in Lincoln and, possibly, White Pine Counties in Nevada. It also occurs in Colorado, Idaho, Montana, Nebraska, Utah, and Wyoming. It is found in moist, to very wet, somewhat alkaline or calcareous native meadows near streams, springs, seeps, lake shores, or in abandoned stream meanders that still retain ample groundwater.

Special Status Species Existing Conditions

All potential habitats within the project area were inspected using NAIP color aerial imagery flown in 2006, and vegetation mapping field surveys to identify potential habitat areas. Locations of special status plants encountered during the survey were recorded with a Trimble GeoXT GPS receiver.

No special status plant species were found in the project area from Steptoe Valley south to the Robinson Summit Substation area.

Approximately 160 miles of the SWIP Corridor south of Robinson Summit Substation was evaluated at a reconnaissance level. Habitat areas known to support sensitive plants were inspected, and areas with reasonable vehicle access were inspected for the presence or absence of habitat. White River catseye, a BLM sensitive species, was observed at the Jake's Wash area in White Pine County within Segment 6C. Tiehm's blazing star and White River catseye, BLM sensitive plants, were observed in the White River Valley area in White Pine and Nye Counties, and also within Segment 6C. White bear poppy, a BLM sensitive species, was observed just west of Coyote Spring within Segment 9D. JBR (2008a) provides maps of observed special status plants for the entire project area.

3.7.4 Specific Project Area Conditions

3.7.4.1 Plant Sites

Within the South Plant Site, three communities were observed with Douglas rabbitbrush and black sagebrush encompassing 97 percent of the site area, and winterfat comprising the remaining 3 percent. Within the associated worker village, greasewood represented 57 percent

of the survey area, Wyoming sagebrush comprised 40 percent, with the remaining 3 percent being disturbed land.

Within the North Plant Site, seven communities were observed with greasewood encompassing 54 percent of the area; salt desert shrub encompassing 28 percent; Wyoming sagebrush and Douglas rabbitbrush encompassing 9 percent and 6 percent respectively; and basin big sagebrush, shadscale, and winterfat being minor components. Within the associated worker village, Wyoming sagebrush made up 53 percent of the survey area, agriculture/pasture made up 40 percent, and disturbed land occupied the remaining 7 percent.

The Mt. Wheeler Transmission Line corridor area consists of 47 percent Wyoming sagebrush and 30 percent disturbed land with smaller (less than 10 percent) communities of winterfat, greasewood, salt desert shrub, Douglas rabbitbrush, agriculture/pasture, riparian, and black sagebrush communities present.

3.7.4.2 Electric Transmission Facilities

Robinson Summit Substation

Within the Robinson Summit Substation survey area, four communities were observed. Wyoming sagebrush comprised the majority of the area at 69 percent and pinyon-juniper woodland occupied 30 percent. Small areas of black sagebrush and basin big sagebrush were also observed.

Harry Allen Substation

Within the Harry Allen Substation survey area, the creosote bush community comprised 80 percent and disturbed land occupied the remaining 20 percent.

Electric Transmission Corridors

The electric transmission corridors extend from the proposed and alternative plant sites in Steptoe Valley south to the Harry Allen Substation in Clark County. Within the transmission corridors, 20 of the 24 vegetative and/or land type communities were observed. Wyoming sagebrush, Douglas rabbitbrush, black sagebrush, greasewood, and pinyon-juniper were the most prevalent in the northern corridors, including Segments 1A, 1B, 1C, 1D, 3, and 6C; Douglas rabbitbrush was dominant in Segment 8; and Joshua tree and creosote bush were dominant in Segments 9A, 9B, 9C, 9D, 10, and 11. A large burn area was observed in Segment 10, and significant patches of winterfat were encountered in Segments 6C and 9B. Other communities observed within the electric transmission corridors included alkaline meadow, basin big sagebrush, blackbrush, desert playa, disturbed land, riparian, rubber rabbitbrush, salt desert shrub, shadscale, and wetland.

3.7.4.3 Water Supply Facilities

The water supply elements consisted of well fields and a water supply pipeline corridor from Lages Station south through the North Plant Site and continuing to the South Plant Site, as well as a pipeline corridor extending from the water impoundments at the KCC facility in Duck Creek Valley north and west to the South Plant Site. Within the Lages Station Well Field, the greasewood community dominated the area by occupying 79 percent. Agricultural/pasture encompassed 17.5 percent with the Wyoming sagebrush community and disturbed land occupying the remaining area. The North, Middle, South, and Limited South well field areas are encompassed within the pipeline survey corridors, and are discussed below.

Within the pipeline elements, a total of 12 communities were observed. Wyoming sagebrush, greasewood, and Douglas rabbitbrush were the dominant communities comprising 33 percent, 25 percent, and 22 percent, respectively. Rubber rabbitbrush made up 11 percent, with the

remaining 9 percent occupied by alkaline meadow, salt desert shrub, winterfat, black sagebrush, dune, shadscale, basin big sagebrush, and disturbed land communities.

3.7.4.4 Rail Facilities

The rail line elements consisted of a rail lead from the existing NNRy to the South Plant Site and a rail lead from the existing NNRy to the North Plant Site, as well as an Alternative Rail Line extending from Shafter to the plant sites that generally parallels the NNRy. Within the rail leads, seven communities were observed with greasewood encompassing 56 percent of the area. Douglas rabbitbrush made up 21 percent, Wyoming sagebrush occupied 10 percent, and rubber rabbitbrush encompassed 7 percent. The remaining 5 percent of the area was encompassed by alkaline meadow, dune, and winterfat. Within the Alternative Rail Line study area, ten communities were observed, with greasewood encompassing 35 percent and Wyoming sagebrush encompassing 28 percent of the area of analysis. Douglas rabbitbrush comprised 15 percent, salt desert shrub occupied 9 percent, and dune occupied 6 percent. The remaining 7 percent of the area was comprised of alkaline meadow, black sagebrush, disturbed land, rubber rabbitbrush, and winterfat with no other community occupying more than 2 percent of the area.

3.8 Wildlife Resources, Including Special Status Wildlife, Migratory Birds, Fisheries, and Aquatic Species

As described in **Section 3.7**, 24 vegetation communities/cover types were mapped within the 400-mile-long survey area, including Steptoe Valley. Elevations range from approximately 2,350 feet amsl at the southern-most portion of the Project at the Harry Allen substation to about 7,850 feet near Silver King Pass. The project area terrain is highly diverse and includes high desert valleys, low alkali playas, steep rocky cliffs, and high mountain passes. The varying combinations of vegetation types, elevation, and terrain provide a wide variety of habitat for wildlife in the region.

The Nevada Department of Wildlife (NDOW) lists 161 species of mammals, 173 species of fish, 24 species of amphibians, 78 species of reptiles, and 456 species of bird within the state (NDOW 2007a). This section addresses wildlife species that occur, or have the potential to occur, in the project area. Wildlife species with special status (listed as Threatened (T), Endangered (E), Proposed (P), and Candidate (C), or Sensitive (S) by government agencies) are also addressed in this section. Special status plants are discussed in **Section 3.7**.

3.8.1 Area of Analysis

The area of analysis, identical to that described previously in **Section 3.7.1** (**Figure 3.7-1**), was defined as the potential disturbance footprint of any of the components of the Proposed Action or Action Alternatives being carried forward for full analysis, plus a variable corridor width ranging between 600 to 2,800 feet wide depending upon the project component (i.e., water line, transmission line, rail leads). Further, a 0.5 mile area on each side of proposed linear facilities was considered for sage grouse, bats, and raptor species.

A larger area, adjacent to the area of analysis identified above (**Figure 3.7-2**), was also generally considered in terms of existing habitats, known occurrences of sensitive wildlife species, etc. so that potential direct and indirect effects to wildlife resources could be analyzed in **Section 4.8**.

3.8.2 Data Sources and Methods

The areas of analysis were evaluated through a combination of existing data review, including information provided by the BLM, USFWS, NDOW, Nevada Natural Heritage Program (NNHP), and previous biological surveys; and extensive biological field surveys conducted in fall 2006 and spring/summer 2007. Prior to conducting wildlife surveys, various data from these sources were reviewed to familiarize survey crew members with the habitat types and wildlife species that were likely to be encountered in the survey area. The survey crew familiarized themselves with special status wildlife species and their habitat types. Appropriate buffer zones surrounding the project features to be surveyed were plotted on maps, aerial photos, and GPS units.

Pedestrian surveys were used when nearby access roads were unavailable, when wildlife habitat communities appeared highly variable, or in the presence of existing or potential special status wildlife habitat. Windshield surveys were used where habitat communities appeared to be consistent and uniform across large expanses, and required only brief visual inspection. Additionally, aerial surveys via helicopter observation were conducted for the Alternative Rail Line extending from Shafter to Mizpah Point, where road access was extremely limited. Vegetation species composition, ecological conditions, and the presence of wildlife were recorded during field surveys.

Special status wildlife species were identified through field surveys within known habitat types in the areas of analysis. Vegetative communities were used to identify potential suitable habitat for special status species within the areas of analysis described above. Specific ground-based field surveys within potentially suitable habitat were conducted for special status species and raptors. Surveys designed to identify active sage grouse (*Centrocercus urophasianus*) leks within the project area were conducted during the 2007 breeding season.

Extensive raptor surveys were conducted primarily during the nesting season of 2007. Surveyors were provided the locations of known raptor habitat and nesting areas, and aerial photographs were analyzed in order to locate any additional potential raptor habitat. This information was then used in the field to locate and record raptor habitat that could be affected by the development of the EEC project.

3.8.3 Existing Conditions

3.8.3.1 Threatened, Endangered, Proposed, and Candidate Species

The USFWS identified four threatened, endangered, proposed, and candidate (TEPC) species that are known or expected to occur within the EEC project area (USFWS 2007a. File No.1-5-07-SP-282). These species are listed in **Table 3.8-1**; background information on each species follows the table. **Appendix 3B** lists the TEPC Species that are known to occur within the three BLM Districts the project area occurs within, the general habitat types the species are generally found in, and whether any of these species were observed during field baseline surveys.

TABLE 3.8-1. TEPC WILDLIFE SPECIES LISTED AS OCCURRING WITHIN THE COUNTIES AFFECTED BY THE EEC PROJECT

COMMON NAME	SCIENTIFIC NAME	USFWS STATUS
Western yellow-billed cuckoo	*Coccyzus americanus*	Candidate
Southwestern willow flycatcher	*Epidonax tralii extimus*	Endangered
Yuma clapper rail	*Rallus longirostris yumanensis*	Endangered
Desert tortoise	*Gopherus agassizii* (Mojave Population)	Threatened
Desert tortoise	*Gopherus agassizii* (Mojave Population)	Critical Habitat

Source – USFWS 2007a

Western Yellow-billed Cuckoo

The western yellow-billed cuckoo (*Coccyzus americanus)* has been identified as a Candidate species for listing as Threatened or Endangered in its range west of the Rocky Mountains (66 FR 38611). The State of Nevada has ranked the western yellow-billed cuckoo as an S1 protected species.

Yellow-billed cuckoos breed in large blocks of riparian habitats (particularly woodlands with cottonwoods and willows). They are low/shrub nesting birds that primarily feed on large insects such as caterpillars and grasshoppers, but have also been known to eat small frogs and arboreal lizards. Nesting peaks (mid-June through August) may be influenced by an abundance of caterpillars and other prey.

Historically, the yellow-billed cuckoo was widespread and common in California and Arizona, locally common in a few river reaches in New Mexico, common very locally in Oregon and Washington, and generally scattered in drainages of the arid and semiarid portions of western Colorado, western Wyoming, Idaho, Nevada, and Utah (USFWS 2002).

This species has been known to occur in Elko, Lincoln, and Nye Counties. However, no suitable yellow-billed cuckoo habitat is known or was observed within the project area during baseline surveys conducted in 2006 and 2007, thus this species will not be discussed further in this EIS.

Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Epidonax tralii extimus*) was listed as Endangered on February 27, 1995, with Critical Habitat designated in 2005. The critical habitat that the USFWS designated is an 18.6-mile-long stretch along the Virgin River from the Arizona border to the Overton Wildlife Management Area in Nevada.

The breeding range of the southwestern willow flycatcher includes southern California, Arizona, New Mexico, extreme southern portions of Nevada and Utah, far western Texas, perhaps southwestern Colorado, and extreme northwestern Mexico. In Nevada this subspecies can be found along the Virgin River, lower Muddy River, Colorado River, and Pahranagat Valley. The southwestern willow flycatcher breeds in relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands including lakes and reservoirs.

This species has declined because of removing, thinning, or destroying riparian vegetation; water diversions and groundwater pumping which alter riparian vegetation; overstocking or other mismanagement of livestock; and recreational development. In addition to the above threats, the southwestern willow flycatcher is also subject to cowbird parasitism (USFWS 2007b).

The southwestern willow flycatcher has been known to occur in Lincoln, Nye, and Clark Counties. Segment 9D of RS-HA #1 passes less than 1,000 feet within the extreme southeastern portion of the Pahranagat National Wildlife Refuge (NWR). The Pahranagat NWR is not designated as critical habitat for the southwestern willow flycatcher. No suitable southwestern willow flycatcher habitat is known to exist or was observed within the project area during baseline surveys conducted in 2006 and 2007, thus this species will not be discussed further in this EIS.

Yuma Clapper Rail

The Yuma clapper rail (*Rallus longirostris yumanensis*) was listed as federally Endangered in 1967, although no critical habitat has been designated for this species. The Yuma clapper rail is a marsh bird found in dense cattail or cattail-bulrush marshes along the lower Colorado River in Mexico north to the lower Muddy River and Virgin River in Utah above those rivers' confluence

with Lake Mead. In Nevada, this subspecies can be found along the Virgin River and lower Muddy River, along the Colorado River around Lake Mohave, and in the Las Vegas Wash.

Threats include habitat destruction, primarily due to stream channelization and drying and flooding of marshes, resulting from water flow management on the lower Colorado River. Most U.S. habitat is in national wildlife refuges and state wildlife management areas that are subject to water management practices of the U.S. Bureau of Reclamation. Additional threats include contaminants from agricultural tailwaters and exotic vegetation (USFWS 2007a).

No suitable Yuma clapper rail habitat is known or was observed within the project area during baseline surveys conducted in 2006 and 2007, thus this species will not be discussed further in this EIS.

Desert Tortoise

The desert tortoise (*Gopherus agassizii*) can occupy habitats that range from sandy flats to rocky foothills. They have a strong proclivity in the Mojave Desert for alluvial fans, washes, and canyons where more suitable soils for den construction might be found. They range from near sea level to around 7,300 feet, but the most favorable habitat occurs between approximately 1,000 to 3,500 feet in elevation. It is believed that, in their entire lives, these tortoises rarely move more than 2 miles from their natal nest. They also live to be 80-100 years old.

The Mormon Mesa desert tortoise critical habitat lies within the southern portion of the project area (Segments 9D, 10, and 11) (**Figure 3.8-1**). A portion of Segment 11 also runs along the eastern border of the Desert National Wildlife Refuge. Desert tortoises are known to occur within these areas.

In May 2007, triangle protocol surveys (0.5-mile long triangle surveys every 3 miles) for the desert tortoise within the southern portion of the transmission line corridor (Segments 9A, 9C, 9D, 10, and 11) were conducted. **Figure 3.8-1** displays desert tortoise habitat and the location and type of desert tortoise sign observed during the surveys. Based on the data gathered, it appears that overall desert tortoise use for the northern most area surveyed is low (not surprising as this area is at the northern extent of the desert tortoise's range). Highest use occurred along the middle and southern half of the project area surveyed. Only one live tortoise was encountered. Twenty-three tortoise burrows were found. Eight carcasses in various stages of decay were discovered but none were determined to have been recent deaths. All carcasses were those of adult tortoises. Eggshell remains were observed in one burrow. Scat, not associated with a nearby burrow, was observed six times. In addition, a 500-foot survey area surrounding the existing Harry Allen Substation was conducted in fall 2006. This survey documented numerous desert tortoise sign, scat, burrows, and carcasses (JBR 2007b).

3.8.3.2 BLM Sensitive and State of Nevada Special Status Species

In addition to Federally Listed TEPC species in Nevada, sensitive species are defined as those plant and animal species identified by the BLM as species for which population viability is a concern, as evidenced by: (1) a significant current or predicted downward trend in population numbers or density; or (2) a significant current or predicted downward trend in habitat capability that would reduce the species' existing distribution (BLM 2001). The state of Nevada and the BLM provide these species with the same level of protection as is provided for candidate species in BLM Manual 6840.06 C, that is to "ensure that actions authorized, funded, or carried out do not contribute to the need for the species to become listed." The Sensitive Species designation is normally used for species that occur on BLM administered lands for which BLM has the capability to significantly affect the conservation status of the species through

management. **Appendix 3B** lists the numerous Sensitive species that are known to occur within the three BLM district offices that the project area occurs within, the general habitat types the species are generally found in, and whether any of these species were observed during field baseline surveys. Sensitive fish species are discussed in **Section 3.8.3.5**. Background information on several of the "higher profile" Sensitive species that occur or have the potential to occur within the project area that are not discussed in other general wildlife sections are provided below.

Bald Eagle

Formerly a Federally Listed species up until its recent delisting, the bald eagle (*Haliaeetus leucocephalus*) is still protected under the Bald and Golden Eagle Protection Act. During the breeding season, bald eagles are closely associated with water and occur along coasts, lakeshores, or riverbanks, where they feed primarily on fish. Bald eagles typically nest in large trees, primarily cottonwoods (*Populus* sp.) and conifers, although they have also been known to nest on projections or ledges of cliff faces. During winter, bald eagles concentrate wherever food is available. Areas of open water, where fish and waterfowl can be taken, are common wintering sites. Wintering bald eagles have been observed on the Kirch, Pahranagat, and Steptoe Valley Wildlife Management Areas.

No bald eagle nest sites are known to occur in or within close proximity to the project area, and occurrence of this species would be limited to migrating and wintering individuals using the area for hunting and feeding opportunities. All federal and state regulations would be adhered to and mitigation measures that are designed to reduce adverse impacts to avian species would be employed. Therefore, it is highly unlikely that the bald eagle would be significantly affected by the construction, operations, maintenance or abandonment of the EEC project. Thus, this species will not be discussed further in this EIS.

Sage Grouse

Between July 2002 and December 2003 the USFWS received several petitions requesting that the greater sage grouse (*Centrocercus urophasianus*) be listed as threatened or endangered rangewide. On April 21, 2004, the USFWS announced a 90-day petition finding in the Federal Register (69 FR 21484) that these petitions taken collectively, as well as information in their files, presented substantial information indicating that the petitioned actions may be warranted. On January 12, 2005, the USFWS announced that the 12-month finding (70 FR 2244), after reviewing the best available scientific and commercial information, found that listing the greater sage-grouse was not warranted. Western Watersheds Project filed a complaint on July 14, 2006, alleging that this finding was arbitrary and capricious under the Administrative Procedure Act (5 U.S.C. 701 *et seq.*). On December 4, 2007, the U.S. District Court, District of Idaho, ruled that the 12-month petition finding was in error and remanded the case to the USFWS for further consideration. Legal action is still pending and the Court has not yet set a date for completion of the remand.

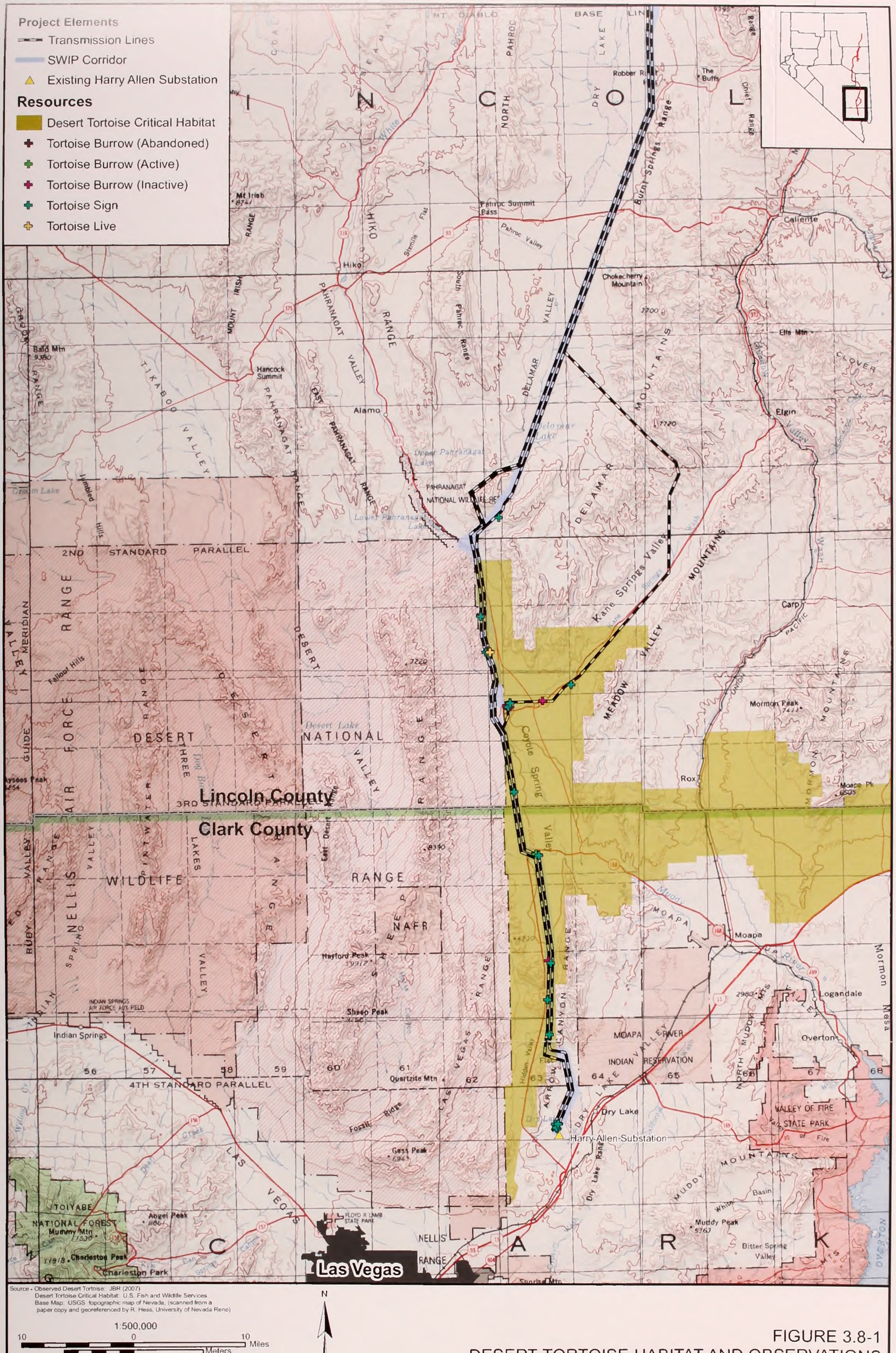


FIGURE 3.8-1
DESERT TORTOISE HABITAT AND OBSERVATIONS
ELY ENERGY CENTER

Subject to any new court order, the USFWS has determined that it is appropriate to initiate a new status review to address information that has become available since the 2005 petition finding. That finding relied, in part, on information in the "Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats" published in 2004 by the Western Association of Fish and Wildlife Agencies. Since the publication in 2004 of the Conservation Assessment, a significant amount of new research has been completed and new information has become available regarding threats, conservation measures, and population and habitat status of the greater sage grouse. Unless the court requires an earlier completion date for a remanded 12-month finding, it is the intention of the USFWS to complete this new status review and make a new determination at that time as to whether listing is warranted. At this time the USFWS is soliciting new information on the status of and potential threats to the greater sage grouse. Information submitted prior to January 12, 2005, will be considered and need not be resubmitted. The USFWS will base a new determination as to whether listing is warranted on a review of the best scientific and commercial information available, including all such information received as a result of a notice published in the Federal Register on February 26, 2008. (FR Doc. E8–3374 Filed 2–25–08).

Numerous sage grouse studies and surveys by NDOW, the BLM, and other entities have been conducted and are ongoing within and adjacent to the project area. Due to the current wealth of information that exists concerning sage grouse habitat, aerial surveys to identify new lek areas were not conducted. Instead, NDOW and BLM biologists were consulted and suggestions were made that identified areas where focused sage grouse surveys (specifically for this project) were needed. Once suitable sage grouse habitat was identified in these areas, JBR conducted ground-based pre-sunrise/early morning surveys during the sage grouse mating season, April 2007. Although suitable habitat was identified and surveyed, no active leks were discovered in addition to what had been previously known and identified.

As shown on **Figure 3.8-2**, suitable sage grouse habitat (nesting, summer, and winter ranges) within the project area extends from near the town of Currie in the north to the Dry Lake Valley in the south. In addition, **Table 3.8-2** displays the sage grouse leks that occur within or near the project area. **Figure 3.8-2** displays the locations of these leks.

TABLE 3.8-2. SAGE GROUSE LEKS IN OR NEAR THE EEC PROJECT AREA

LEK NAME	ACTIVE/ NOT ACTIVE/ HISTORIC	APPROXIMATE DISTANCE FROM CLOSEST FEATURE'S - OUTER PROJECT AREA BOUNDARY
Becky Spring	Active	2.0 miles from the Lages Station Well Field / 1.4 miles from the North Plant Site Worker Village
Borchert Spring N	Active	1.2 miles from Segment 1B (Line #1)
Raiff Siding	Unknown	0.9 miles from Segment 4A (Line #1)
N Tehama Creek	Inactive	2.0 miles from the Lages Station Water Line
Whiteman Creek	Active	1.7 miles from the Lages Station Water Line
Log Canyon N	Active	0.1 miles from Segment 1C (Line #1)
Mud Spring N	Active	0.1 miles from Segment 1C (Line #2)
Water Canyon Bench	Unknown	0.9 miles from Segment 4A (Line #1)
Dry Canyon 3	Unknown	2.0 miles from Segment 4A (Line #2)
Dry Canyon	Unknown	0.9 miles from Segment 4A (Line #1)
Dry Canyon 2	Active	1.3 miles from Segment 4A (Line #2)
Dry Canyon Road	Unknown	2.0 miles from Segment 4A (Line #2)
Paine Springs	Historic	0.8 miles from the Duck Creek Water Impoundment
Glenn Siding	Historic	Within the South Plant Site
Heusser Mountain E	Historic	0.2 miles from Alternative Segment 3 (Line#1)
McGill Junction	Unknown	Within Segment 3 (Line #2)
Butte Valley SE	Unknown	1.2 miles from Segment 1D (Line #2)
South Butte Valley 2	Inactive	0.1 miles from Segment 1D (Line #2)
South Butte Valley 3	Inactive	0.4 miles from Segment 1D (Line #1)
Blackjack W	Unknown	0.3 miles from Segment 6C (Line #2)
Gardner Ranch N	Unknown	1.8 miles from Segment 6C (Line #2)
Ellison Creek N	Active	0.5 miles from Segment 6C (Line #1)
Ellison Creek N N	Inactive	Within Segment 6C (Line #2)
Runway	Unknown	0.3 miles from Segment 6C (Line #2)
Ellison Creek	Inactive	1.0 miles from Segment 6C (Line #2)
Ellison Knobs	Unknown	1.7 miles from Segment 6C (Line #2)
White River	Active	0.2 miles from Segment 6C (Line #2)

Source – NDOW
Active: Occupied in 2006
Inactive: No birds or sign for two years
Historic: No birds or sign observed for over 20 years

Pygmy Rabbit

The pygmy rabbit (*Brachylagus idahoensis*) occurs throughout most of the Great Basin. However, the distribution and population trends of this species are largely unknown (BLM 2008a). Currently, the pygmy rabbit is a BLM Sensitive species and a State of Nevada Species of Special Concern. It was also a former Category 2 Candidate Species. A formal listing petition was received from environmental groups in April 2003 that required the USFWS to make a determination on whether there was substantial information to initiate a status review of the pygmy rabbit. The USFWS concluded that more research was needed to better determine the distribution and abundance of the species throughout its range (USFWS 2005).

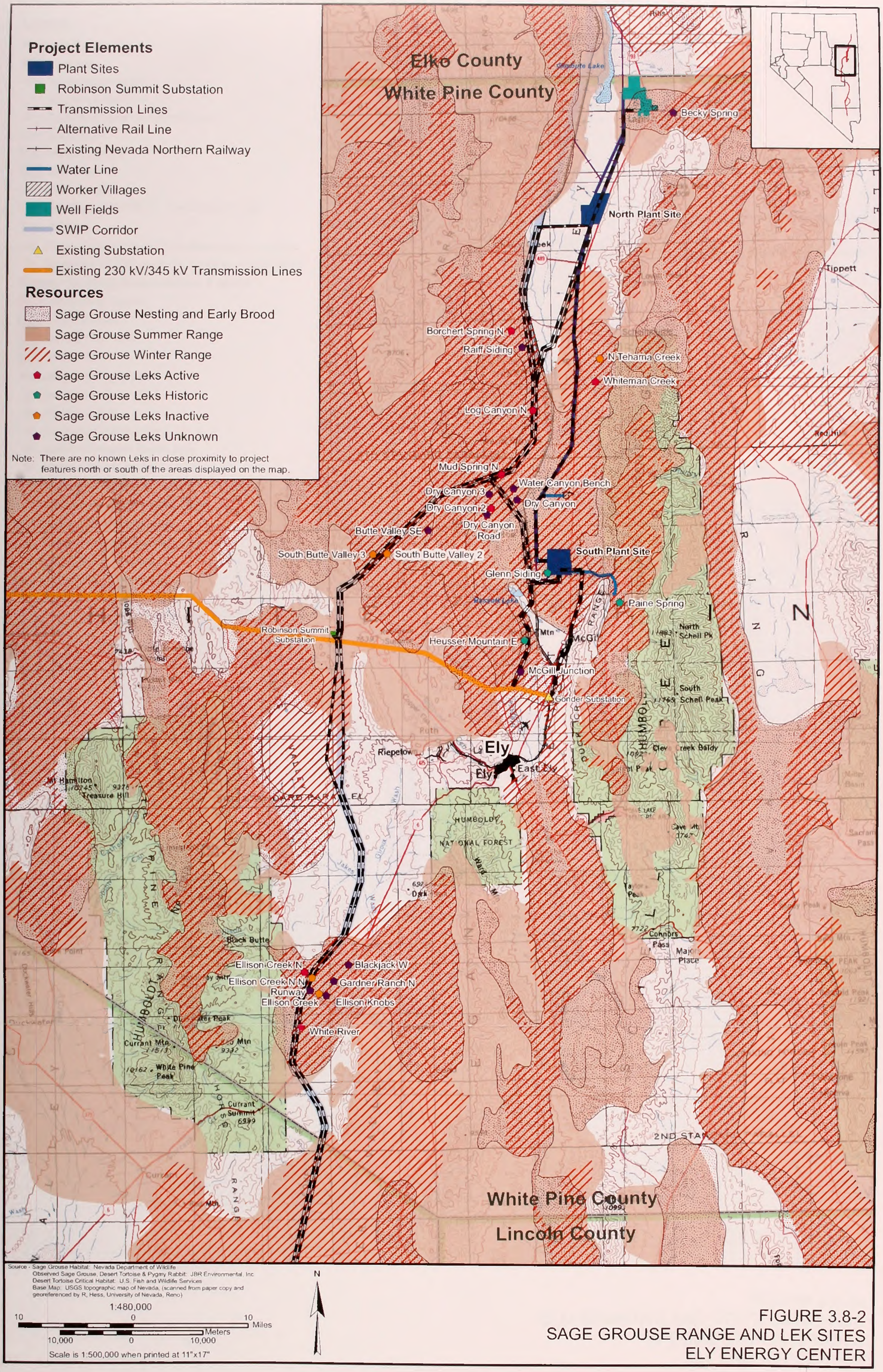
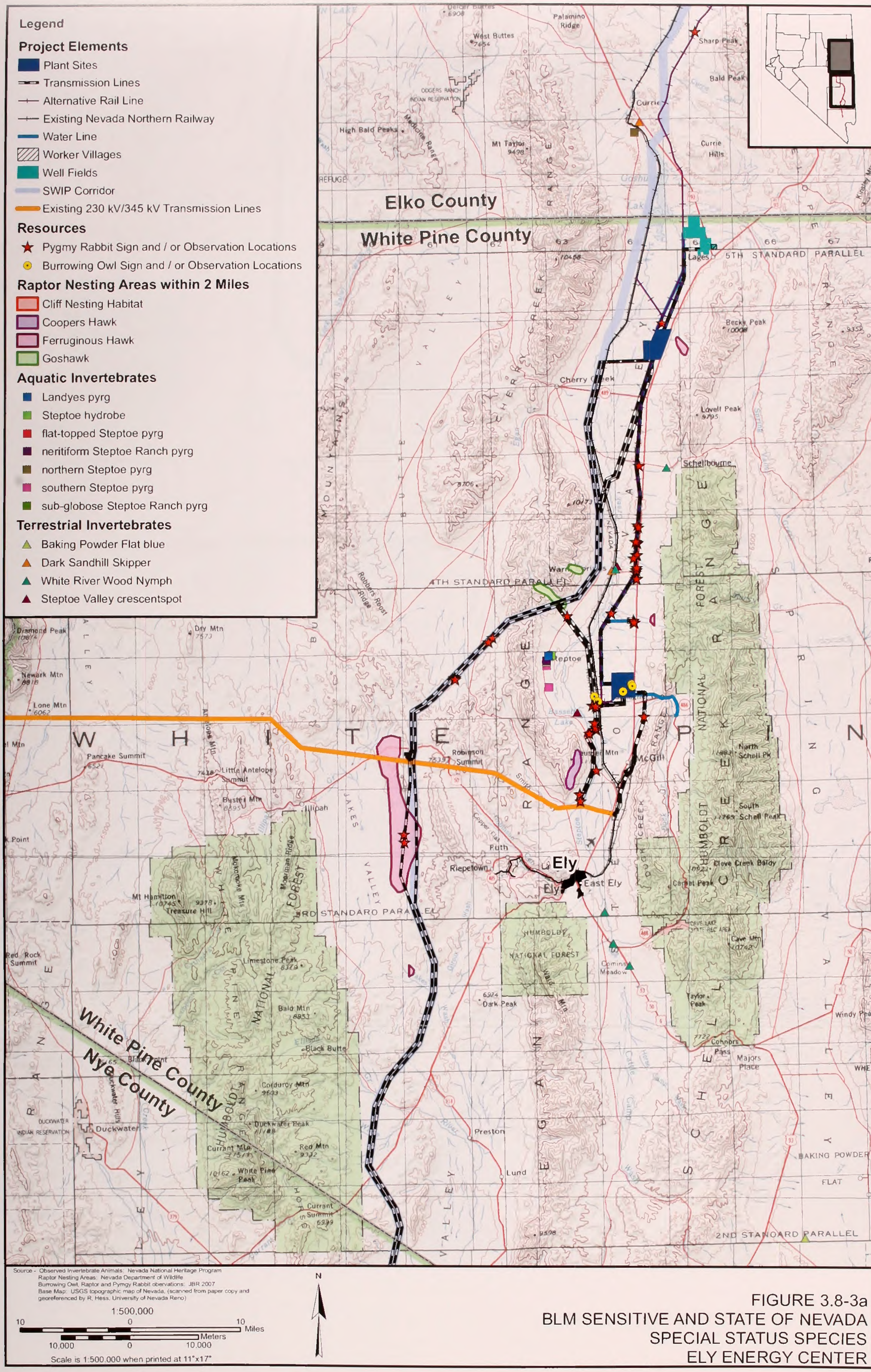


FIGURE 3.8-2
SAGE GROUSE RANGE AND LEK SITES
ELY ENERGY CENTER



Source - Observed Invertebrate Animals: Nevada National Heritage Program
Raptor Nesting Areas: Nevada Department of Wildlife
Burrowing Owl, Raptor and Pymgy Rabbit obervations: JBR 2007
Base Map: USGS topographic map of Nevada, (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno)

FIGURE 3.8-3a
BLM SENSITIVE AND STATE OF NEVADA
SPECIAL STATUS SPECIES
ELY ENERGY CENTER

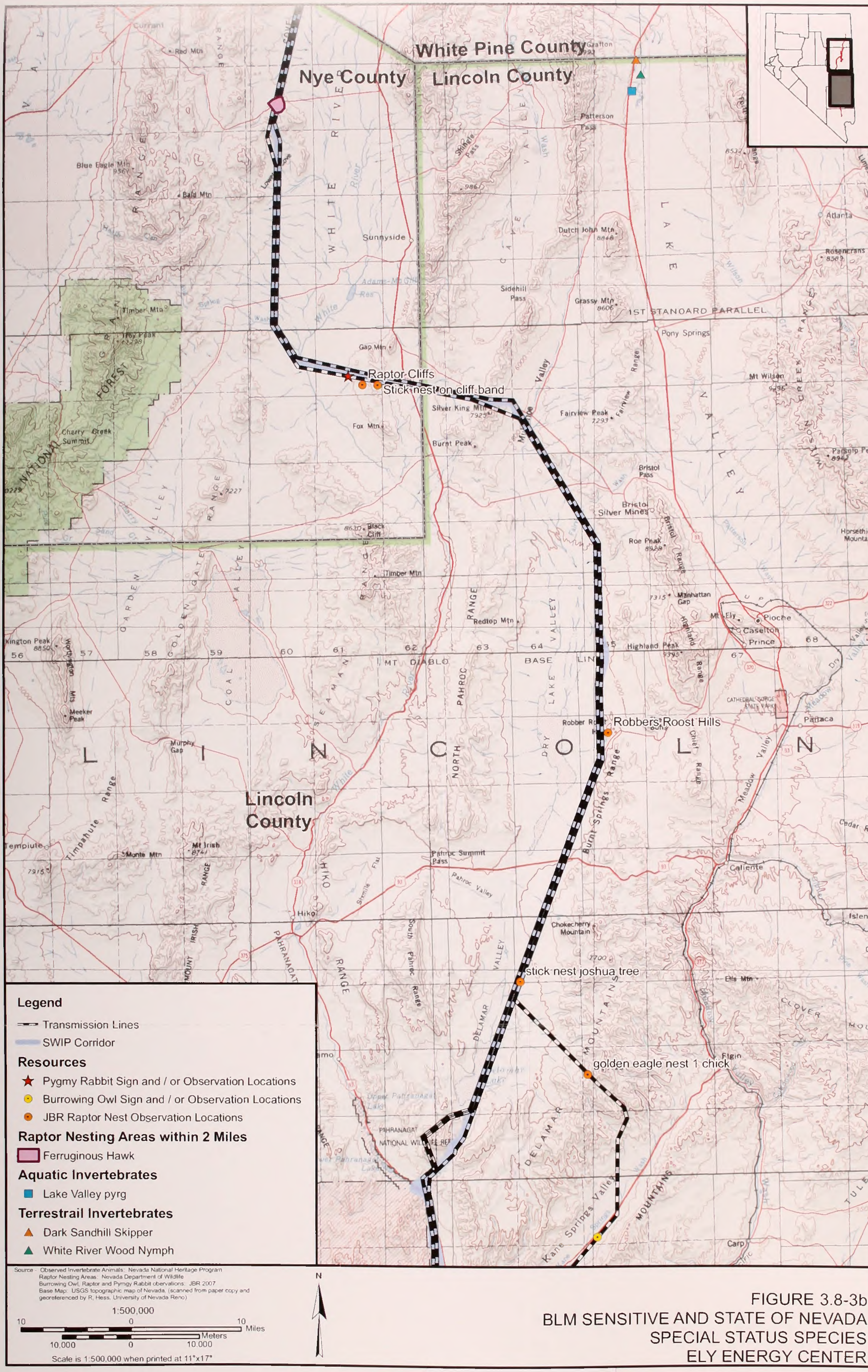


FIGURE 3.8-3b
BLM SENSITIVE AND STATE OF NEVADA
SPECIAL STATUS SPECIES
ELY ENERGY CENTER

On January 8, 2008 the USFWS announced a 90-day finding on a petition to list the pygmy rabbit as threatened or endangered under the Endangered Species Act of 1973, as amended. The USFWS finds that the petition presents substantial scientific or commercial information indicating that listing the pygmy rabbit may be warranted. Therefore, the USFWS is initiating a status review to determine if listing the species is warranted. To ensure that the status review is comprehensive, the USFWS is soliciting scientific and commercial data and other information regarding this species. They will then make a determination on critical habitat for this species, which was also requested in the petition, if and when the USFWS initiates a listing action (FR Doc. E7-25017 Filed 1-7-08).

During baseline vegetation and general wildlife surveys conducted between the fall of 2006 and summer of 2007, pygmy rabbits and suitable habitat were observed within many of the project features within Steptoe Valley and extending south through the Segment 6C Transmission Line (**Figures 3.8-3a and 3.8-3b, and Appendix 3B**).

Raptors

The project area is home to many types of raptors including hawks, owls, eagles, accipiters, and falcons. Population information for many of the resident species in Nevada is not available, and where there is species-specific information, general trends in raptor populations are not consistent. Densities of some raptors, such as the short-eared owl (*Asio flammeus*), fluctuate based on prey availability, but are considered to be adequate for healthy populations. Populations of some species such as the Swainson's hawk (*Buteo swainsoni*) have been increasing in Nevada, although surveys indicate they have not reached historic densities. Surveys also indicate populations of other species such as the prairie falcon (*Falco mexicanus*) have continued to decline (Nevada Partners in Flight 2002). The planning area offers significant habitat for species dependant on sagebrush, salt desert scrub, and pinyon-juniper habitats. The highest densities of ferruginous hawks (*Buteo regalis*) in Nevada occur within the planning area. Nevada represents a large portion of the basin and range province, which supports 28 percent of the world population of prairie falcons (Nevada Partners in Flight 2002). Prairie falcons nest in cliffs and rock outcrops; other raptors within the planning area may use rock outcrops, trees, or burrows as nesting sites.

The habitat types in the project area provide numerous nesting, perching, and foraging opportunities for a variety of raptor species from early spring (February/March) to late summer (August). Surveys for raptor nests in high potential habitats occurring within portions of the project area were conducted for this project. Twelve species of raptors were observed during baseline surveys. These species include: sharp-shinned hawk (*Accipiter striatus*), red-tailed hawk (*Buteo jamaicensis*), cooper's hawk (*Accipiter cooperii*), American kestrel (*Falco sparverius*), peregrine falcon (*Falco peregrinus*), ferruginous hawk, Swainson's hawk, great horned owl (*Bubo virginianus*), Long-eared owl (*Asio otus*), Northern harrier (*Circus cyaneus*), golden eagle (*Aquila chrysaetos*), and turkey vulture (*Cathartes aura*). **Figures 3.8-3a and 3.8-3b** show the location of previously recorded and newly identified known raptor areas and nest locations within 2 miles of the project area.

Western Burrowing Owl

The western burrowing owl *(Athene cunicularia hypugaea)* is a grassland specialist distributed throughout western North America. The western burrowing owl is protected by the Migratory Bird Treaty Act and is protected under Nevada Revised Statues 501 and the Nevada Administrative Code 503. The Nevada Natural Heritage Program ranks the species as an S3B, meaning that it has rare and uncommon breeding populations in the state (BLM 2008a).

Burrowing owls were discovered within the project area and suitable habitat for this species occurs throughout various portions of the project area (**Figures 3.8-3a** and **3.8-3b**).

Bats

Bat breeding and roosting habitat occurs within or adjacent to many portions of the project area, generally in the higher elevation areas where there are areas of cliffs, rock outcroppings, and pinyon-juniper vegetation communities. Foraging habitat for bats within or adjacent to the project area are most likely associated with the wetland/riparian areas of Duck Creek, Steptoe Slough, White River, and various springs.

In addition to the rock outcroppings, cliff areas, and pinyon-juniper habitats observed within the project area for the transmission lines, one area of old mine workings (shafts and adits) was observed in the Egan Range near Water Canyon. No specific bat surveys were conducted.

The majority of the 23 bat species in Nevada could occur throughout the project area; 15 of these species currently are identified as BLM Sensitive Species. Of these, the spotted bat (*Euderma maculatum*) is the only state-protected bat species known to occur within the planning area. This species is ranked as S2/S1 within the planning area, indicating continued presence in the state is imperiled. The spotted bat is designated as BLM and U.S. Forest Service sensitive, and is protected by Nevada State Law (BLM 2008a). Spotted bats inhabit Goshute Cave in the Cherry Creek Range. This cave is located more than 5 miles from the closest project feature.

Banded Gila Monster

The banded Gila monster (*Heloderma suspectum cinctum*) is a BLM sensitive species and is currently ranked as a State of Nevada S2 species. Gila monsters range from the eastern Mojave to the northern Sonora desert. County status of this species is unknown due to the elusive nature of this reptile which is believed to spend approximately 95 percent of its life underground. Species distribution is inferred from habitat preferences and has been collected historically in both Clark and Lincoln Counties. It frequents Mojave desert scrub, mesquite/catclaw, blackbrush, pinyon-juniper, and desert riparian habitats. Gila monsters are typically found on the lower slopes of rocky canyons, mesic areas, and flats with grassland or succulents. It uses rocks and burrows of other animals for cover and it searches for prey items, such as eggs of ground-nesting birds, reptiles, lizards, and insects, primarily at night, although it may be active during the day. Gila monsters may also focus feeding efforts on locating desert tortoise eggs (Clark County MSHCP and EIS 2000).

Potential banded Gila monster habitat exists within the vicinity of the southernmost portions of the electric transmission lines in Lincoln and Clark County. Its geographic range approximates that of the desert tortoise and is coincident to the Colorado River drainage (**Figure 3.8-1**). No incidental occurrences of this species were observed within the project area during desert tortoise triangle surveys conducted in 2007 (see **Section 3.8.3.1**).

Terrestrial Invertebrates

The NNHP and the BLM list numerous Sensitive invertebrates with the potential to occur within the EEC project area (**Appendix 3B** and **Figures 3.8-3a** and **3.8-3b**). According to the NNHP data, the dark sandhill skipper *(Polites sabuleti nigrescens)*, the Steptoe Valley crescentspot *(Polites sabuleti sinemaculata)*, and the White River wood nymph *(Cercyonis pegala pluvialis)* have all been recorded in Steptoe Valley near the project area. Specifically, the dark sandhill skipper has been recorded near Steptoe Slough and Warm Springs (along Duck Creek), the Steptoe Valley crescentspot has been recorded near Bassett Lake, Steptoe Slough, and Warm Springs (along Duck Creek) and the White River wood nymph has been recorded near Warm Springs.

Aquatic Invertebrates
Numerous sensitive aquatic invertebrates (i.e., proposed species of concern) are present in the project area (**Appendix 3B** and **Figures 3.8-3a and 3.8-3b**). These aquatic invertebrates are considered Sensitive because they are endemic to and reliant upon the specific conditions present in the spring in which they occur. Several species of the Hydrobiidae family inhabit the springs of Steptoe Valley. Surveys of Steptoe Valley springs were conducted in 2005. Aquatic snails were documented in 39 of 45 springs surveyed in Steptoe Valley. One species of springsnail, the Northern Steptoe Valley springsnail (*Pyrgulopsis serrata*), was observed in ten springs in the western portion of Steptoe Valley. Prior to these surveys, *P. serrata* had been identified in only three springs in Steptoe Valley (Sada 2006).

3.8.3.3 General Wildlife

Big Game
Big game species within the project area consist primarily of pronghorn antelope, mule deer, Rocky Mountain elk, and two subspecies of bighorn sheep (**Figures 3.8-4a - 3.8-4d**).

Pronghorn Antelope: With the exception of some higher elevation areas, pronghorn antelope (*Antilocapra americana)* year-round range exists within all of the project features that are north of Segments 9C and 9A (**Figure 3.8-4a**). There is no crucial winter range associated with this species in or near the project area.

Mule Deer: Mule deer (*Odocoileus hemionus*) range is also mainly adjacent to portions of the project area. Within the project area, mule deer range is generally associated with the middle to upper elevations (**Figure 3.8-4b**). Habitat for mule deer includes big sagebrush, low sagebrush, shadscale, and grasslands. Mountain mahogany and pinyon-juniper woodlands are important for thermal and escape cover during winter. Riparian areas and sagebrush communities are commonly occupied by mule deer during the summer.

Rocky Mountain Elk: Several portions of the project area are located within Rocky Mountain elk (*Cervus canadensis nelsoni*) year-round range (**Figure 3.8-4c**). The largest herds occur in the Egan and Schell Creek Ranges. Since the late 1990s, elk populations in Lincoln and White Pine Counties have been managed under the guidance of the Lincoln and White Pine Elk Management Sub-plans to the Statewide Elk Species Management Plan. These management sub-plans established population objectives by management unit (BLM 2008a). Elk sign was frequently encountered in the mid to upper elevations crossed by portions of the transmission line alternatives. For details regarding which transmission line segments pass through elk year-round range see **Section 3.8.4.2**.

Desert Bighorn Sheep: As displayed on **Figure 3.8-4d** both occupied and potential desert bighorn sheep *(Ovis canadensis nelsoni)* range occurs within and adjacent to portions of the project area. In 1936, 1.5 million contiguous acres were established in Clark and Lincoln Counties as the Desert National Wildlife Range to primarily benefit desert bighorn conservation. From the late-1980s to present, NDOW has been reintroducing desert bighorn sheep into a number of mountain ranges within the project area (BLM 2008a).

Rocky Mountain Bighorn Sheep: As displayed on **Figure 3.8-4d,** potential Rocky Mountain bighorn sheep *(Ovis canadensis canadensis)* range is located within the project area. Twelve Rocky Mountain bighorn sheep were reintroduced to Mount Grafton in the late 1980s. To date, limited populations of Rocky Mountain bighorn sheep occur on Mount Moriah and Mt. Wheeler in White Pine County, and on Mount Grafton in Lincoln County (BLM 2008a).

Two bighorn sheep rams were observed near the Hercules Gap fissure on the Egan Range during baseline surveys in 2006. Surveyors were unable to determine the distinct species of the rams observed. The Egan and Schell Creek Ranges surrounding Ely is a habitat convergence zone for the two subspecies of bighorn.

Small Mammals

Black-tailed jackrabbits (*Lepus californicus*) were the most common small mammal observed within the project area during baseline surveys. Mountain cottontails (*Sylvilagus nuttallii*) and pygmy rabbits were also commonly observed. Pygmy rabbits are discussed in **Section 3.8.3.2**. Packrat *(Neotoma cinerea)*, rock squirrel (*Spermophilus variegates*), least chipmunk (*Tamias minimus*), Richardson's ground squirrel *(Spermophilus elegans nevadensis)*, white-tailed antelope squirrel *(Ammospermophilus leucurus)*, golden-mantled ground squirrel *(Spermophilus lateralis)*, Piute (Great Basin) ground squirrel *(Spermophilus mollis)*, Townsend's ground squirrel *(Spermophilus townsendii)*, and pygmy shrews *(Sorex minutus)* are other small mammals that were either observed during baseline surveys (**Appendix 3B**) or are known to occur within the project area.

Predatory Mammals

The project area provides a diversity of habitat types for a variety of predators. Predators that were either observed directly or their presence inferred by sign (i.e., tracks, dens, scat) during baseline surveys include: coyote (*Canis latrans),* kit fox (*Vulpes macrotis*), badger (*Taxidea taxus*), and mountain lion *(Felis concolor)*. Other predators that likely occur within or near the project area include: gray fox (*Urocyon cinereoargenteus*) and bobcat *(Lynx rufus)*.

Reptiles

Several species of reptiles were observed within the project area (**Appendix 3B**). Side-blotched lizards (*Uta stansburiana*), western fence lizards (*Sceloporus occidentalis*), and sagebrush lizards (*Sceloporus graciosus*) were the most abundant species of reptile encountered. Desert horned lizards (*Phrynosoma platyrhinos*) and short-horned lizards (*Phrynosoma douglassii*) were observed within Steptoe Valley, near Shafter and in southern Lincoln and Clark Counties. Terrestrial garter snakes (*Thamnophis elegans*) were observed in Middle Canyon, Duck Creek, and near Bassett Lake. One Mojave Desert Sidewinder (*Crotalus cerastes cerastes*) was observed near the south end of Kane Springs Valley. One live desert tortoise and multiple tortoise sign were also observed as discussed in **Section 3.8.3.1**.

Upland Game Birds

The following species of game birds were observed in the project area during baseline surveys: chukar (*Alectoris chukar*), mourning dove (*Zenaida macroura*), California quail (*Callipepla californica*), and sage grouse (discussed in **Section 3.8.3.2**). In addition, blue grouse (*Dendragapus obscurus*), Hungarian partridge (*Perdix perdix*), Gambel's quail (*Callipepla gambelii*), and Rio Grande turkey (*Meleagris gallapavo intermedia*) can also occur within or near the project area.

Appendix 3B lists the bird species observed during the baseline surveys, although numerous other species not observed are known to occur across the habitats found within the project area.

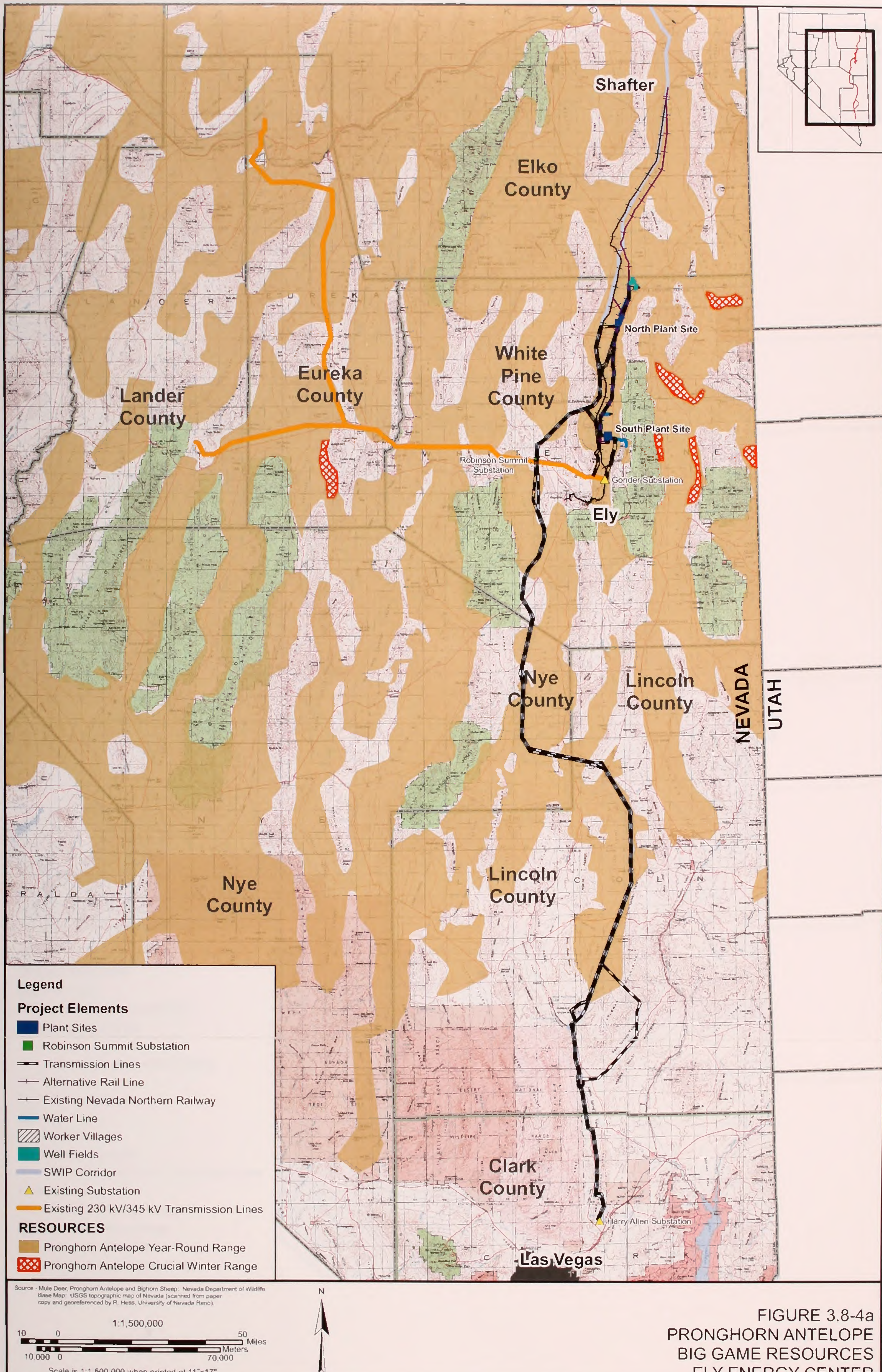
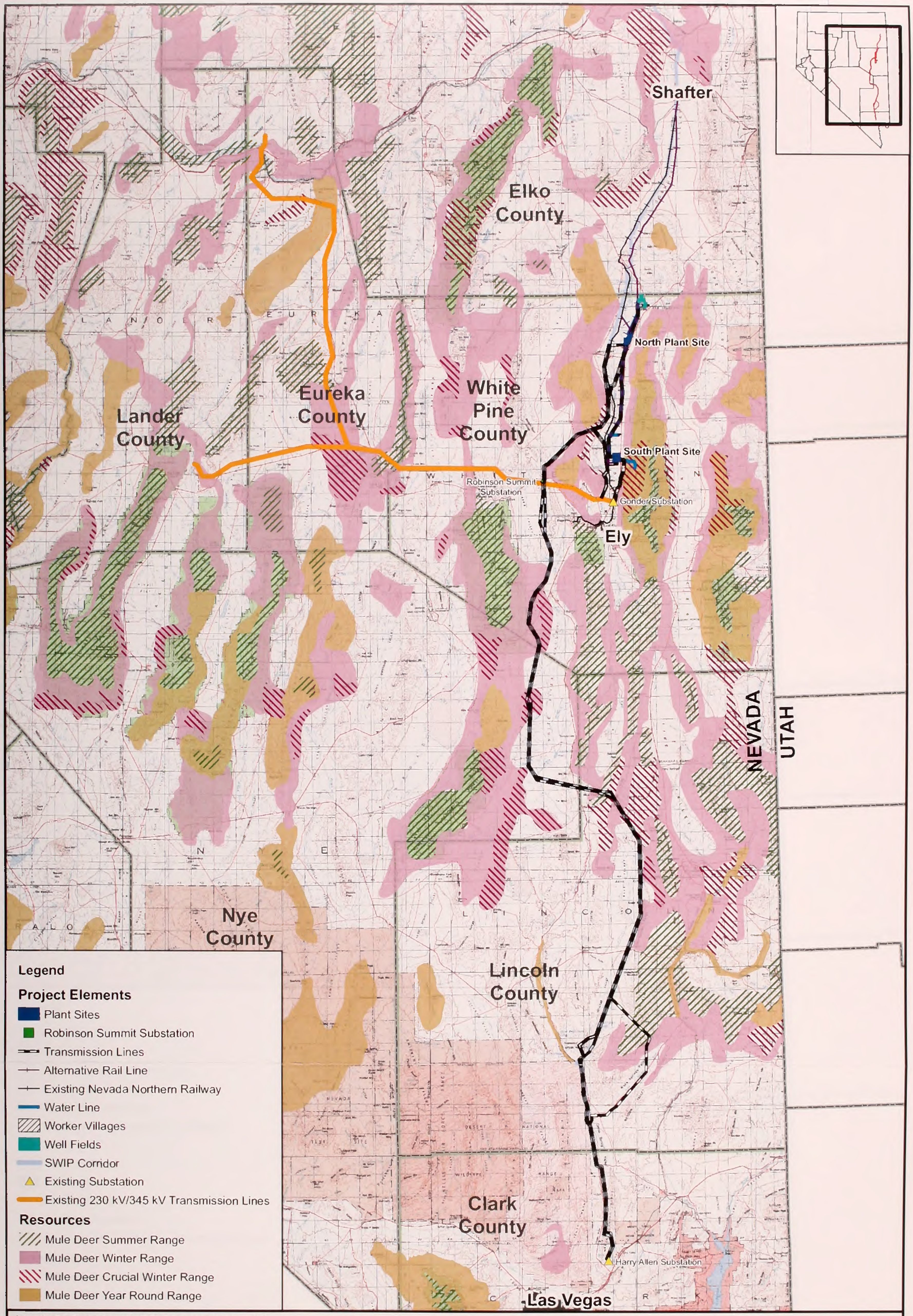


FIGURE 3.8-4a
PRONGHORN ANTELOPE
BIG GAME RESOURCES
ELY ENERGY CENTER



Source - Mule Deer, Pronghorn Antelope and Bighorn Sheep: Nevada Department of Wildlife
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno)

1:1,500,000

10 0 50 Miles
10,000 0 70,000 Meters

Scale is 1:1,500,000 when printed at 11"x17"

FIGURE 3.8-4b
MULE DEER
BIG GAME RESOURCES
ELY ENERGY CENTER

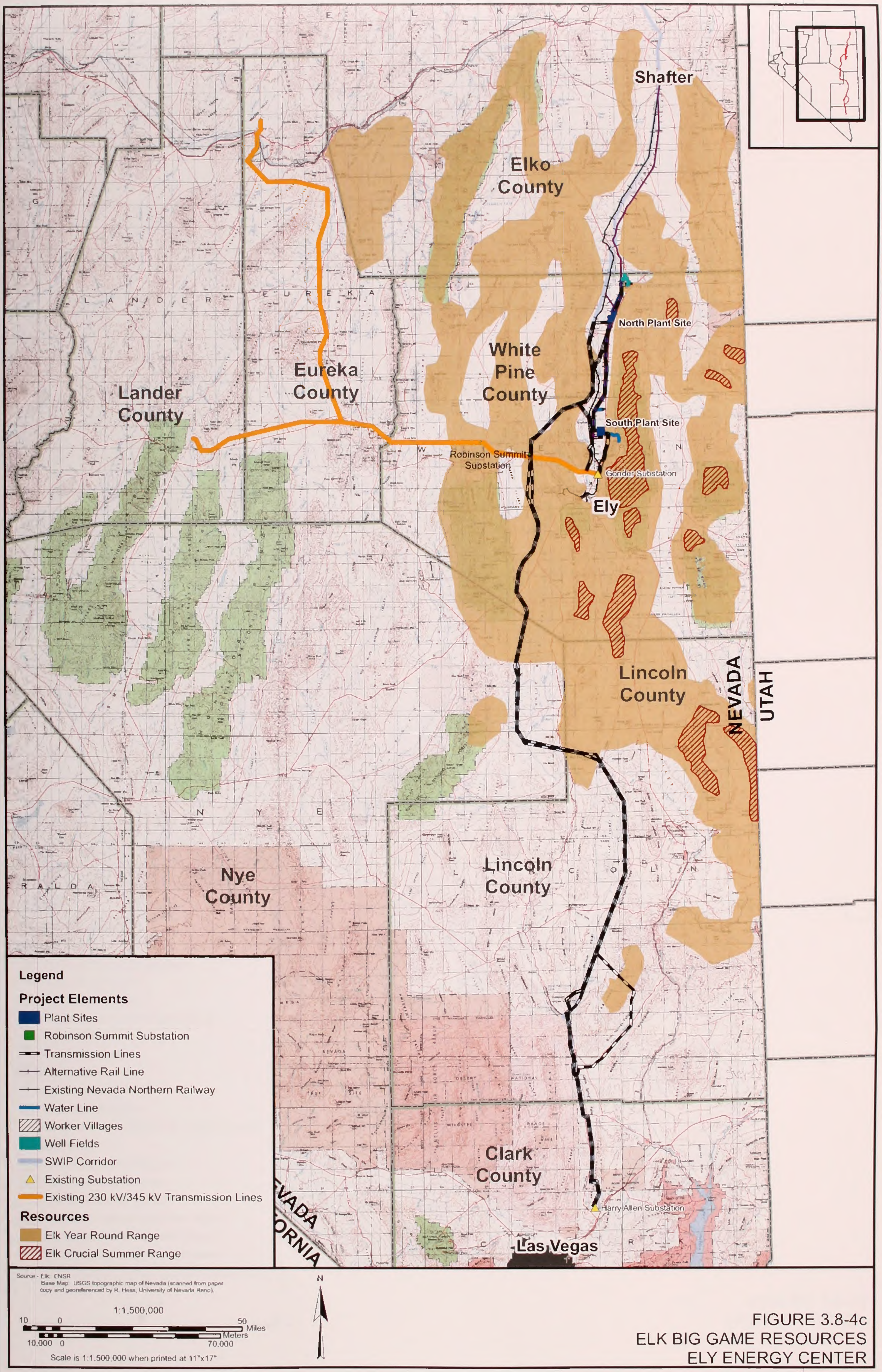


FIGURE 3.8-4c
ELK BIG GAME RESOURCES
ELY ENERGY CENTER

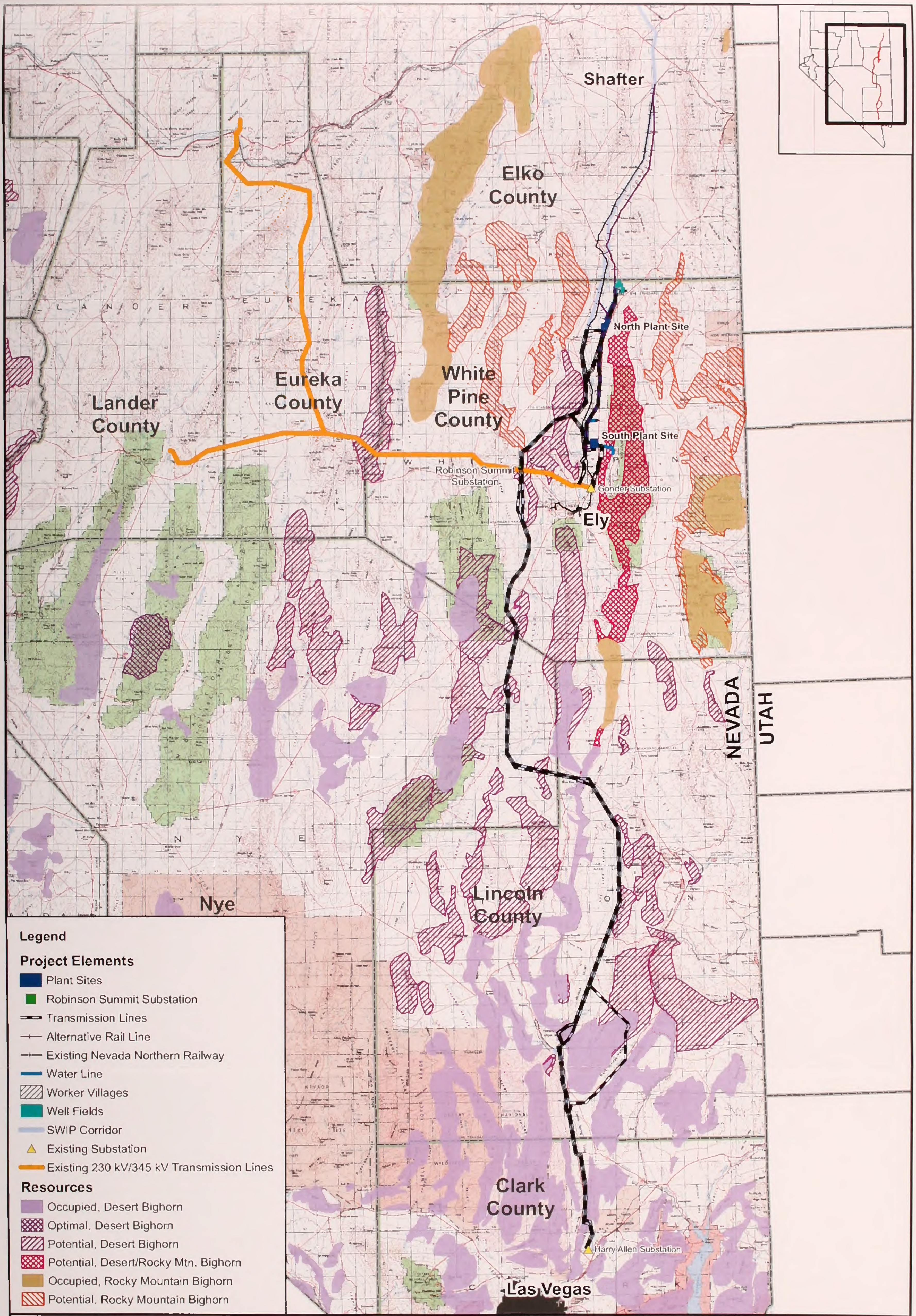


FIGURE 3.8-4d
BIGHORN SHEEP
BIG GAME RESOURCES
ELY ENERGY CENTER

Waterfowl

The project area crosses over or is adjacent to several riparian areas that support a variety of waterfowl species. Several waterfowl sightings were recorded along the length of Duck Creek, from the impoundment pond to where it empties into Steptoe Valley and runs north. Bassett Lake, in the Steptoe Valley Wildlife Management Area, attracts a wide variety of mammals and waterfowl. Transmission Line Segment 6C crosses the southern end of the Kirch Wildlife Management Area. And Segment 9D is located less than 1,000 feet into the southeastern boundary of the Pahranagat Wildlife Management area. The following species were observed in these areas (**Appendix 3B**; American Pipets *[Anthus rubescens]*, American Wigeon *[Anas Americana]*, Canada Geese *[Branta canadensis]*, Coots [*Fulica americana]*, Gadwalls *[Anas strepera]*, Green-winged Teal *[Anas carolinensis]*, Lesser Scaups *[Aythya affinis],* Mallards [*Anas platyrhynchos]*, and Snipes *[Gallinago gallinago]*. Surveyors also observed three Great Blue Herons *[Ardea herodias]* flying south up the Duck Creek drainage.

Appendix 3B lists the waterfowl species observed during the baseline surveys, although numerous other species not observed are known to occur across the habitats found within the project area.

3.8.3.4 Migratory Birds

Migratory birds are protected under the Migratory Bird Treaty Act (16 U.S. Code 703-711) and Executive Order 13186 (66 Federal Register 3853), that in January 2001, President Clinton signed requiring some federal agencies (those taking actions that may negatively impact migratory birds) to develop a MOU with the USFWS to promote the recommendations of various migratory bird programs and conservation considerations.

A list of Birds of Conservation Concern was developed as a result of a 1988 amendment to the Fish and Wildlife Conservation Act. This Act mandates that the USFWS "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." The goal of the Birds of Conservation Concern species list is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions. Therefore, on any actions that could negatively impact migratory birds, the species listed as Birds of Conservation Concern would be reviewed in accordance with Executive Order 13186 (BLM 2008a).

The project area provides a diversity of habitats for many species of migratory birds. Sagebrush vegetation communities, comprising nearly 25 percent of the project area, have been identified as Priority A habitat under the *Coordinated Implementation Plan for Bird Conservation in Nevada*. Priority A habitat is defined as habitat being under high threat, having high opportunity, and high value to birds statewide (Nevada Steering Committee Intermountain Joint Venture 2005).

Appendix 3B lists the bird species observed during the baseline surveys, although numerous other bird species not observed are known to occur across the habitats found within the project area.

3.8.3.5 Fisheries

The major components of the EEC Project are located primarily in the Steptoe and Goshute Valleys. These large valleys are fed by multiple streams and springs draining the Egan, Cherry Creek, Schell Creek, Duck Creek, Goshute, and Pequop Mountain Ranges. Several fish species are known or expected to occur in streams and reservoirs within the project area including:

Egan Creek, Cherry Creek, Goshute Creek, Duck Creek, and Bassett Lake. In addition, numerous springs support populations of fish, primarily the relict dace (*Relictus solitarius*), which is the only species native to these valleys. However, Bonneville cutthroat trout (BCT) (*Oncorhynchus clarki utah*) which are native to the Bonneville Basin, east of the project area, have been established in Goshute Creek. Both relict dace and BCT are BLM sensitive species and are discussed in more detail below. **Table 3.8-3** lists the fish species known to occur in Steptoe and Goshute Valleys.

TABLE 3.8-3. FISH SPECIES FOUND IN STEPTOE AND GOSHUTE VALLEYS

COMMON NAME	SCIENTIFIC NAME	LOCATION
Relict dace*	*Relictus solitarius*	Native, Ruby, Butte, Goshute, Steptoe Valleys
Bonneville cutthroat trout*	*Oncorhynchus clarki utah*	Non-native, Bonneville Basin. Introduced as a refuge population into Goshute Creek.
Rainbow Trout	*Oncorhynchus mykiss*	Non-native
Brook trout	*Salvelinus fontinalis*	Non-native
Largemouth bass	*Micropterus salmoides*	Non-native
Northern pike	*Esox lucius*	Non-native
Common carp	*Cyprinus carpio*	Non-native

* BLM Sensitive Species
Source: Crookshanks 2006a

Relict Dace

The relict dace, a Sensitive species, is a small cyprinid fish, approximately 11 cm, native to springs and low gradient streams in the Ruby, Butte, Goshute, and Steptoe valleys of eastern Nevada (Sigler and Sigler 1987). These valleys were part of the ancient pluvial lakes Franklin, Gale, Waring, and Steptoe. The relict dace is the only fish native to these ancient lakes and their resultant valleys (Crookshanks 2006a). Relict dace generally inhabit springs, spring-fed streams, ponds, intermittent lakes and marshes. Substrate is most commonly fine sediment or stone with highest densities in areas with well-vegetated pools or undercut banks (NatureServe 2006). Heavy growth of filamentous algae, moss, and aquatic macrophytes such as *Chara*, *Nasturtium*, *Potamogeton*, *Utricularia*, *Scirpus*, and *Carex* are characteristic of relict dace habitats (Crookshanks 2006b).

Relict dace are extremely adaptable to a variety of environmental conditions. They have been found in water ranging from approximately 9°C to around 26°C (Crookshanks 2006b). However, as they evolved in isolation from other fishes, including predatory fishes, they are heavily impacted by the introduction of non-native fishes. Extensive surveys of relict dace habitat were conducted in 1994 and 1995, and most recently in 2005 and 2006. Results indicate that relict dace populations are stable within their historic range (Crookshanks 2006b). The recent survey report (Crookshanks 2006b) indicates there are 10 known populations in Steptoe Valley, 12 populations in Goshute Valley, and 3 populations in Butte Valley. In Steptoe Valley, 8 of the 10 populations are near the project area. This includes: 2 populations at the Lusetti Ranch/Grass Springs area; 5 populations in multiple springs at Steptoe Ranch; and a large population inhabiting McGill Springs from the McGill swimming pool down to Steptoe Slough. In Goshute Valley, 11 populations are found in the Johnson/Big Springs Ranch spring complex, the largest, most complex spring system sampled in 2005 and 2006. This spring complex represents the most secure populations of relict dace throughout its historic range. In addition, a large population is found at the Twin Spring/Phalen Creek area.

Bonneville Cutthroat Trout

Bonneville Cutthroat Trout (BCT), a Sensitive species, historically occupied most water bodies with appropriate habitat conditions within the Bonneville Basin, including portions of Utah, Nevada, Idaho, and Wyoming (USFWS 2001; Sigler and Sigler 1996). The distribution and abundance of BCT has declined rangewide, due to habitat destruction, overfishing, and especially the introduction of non-native trout (USFWS 2001; Quist and Hubert 2004). Non-native trout, including rainbow, brown, and brook trout impact native cutthroat trout through hybridization (rainbow trout) and predation (brown and brook trout). As a result, cutthroat trout are often limited to small headwater streams; however, prior to the introduction of non-native fishes cutthroat trout were found throughout streams and large river systems (Quist and Hubert 2004). Key components of cutthroat trout habitat are: cool, clear water; deep pools and cover, typically associated with well vegetated stream banks and large woody debris; floodplain habitat for rearing and velocity refugia, and; the availability of suitable spawning gravels, which should include a minimal amount (<25 percent) of fine substrate less than 6.35 mm in diameter (Harig and Fausch 2002; Chapman 1988; Magee et al. 1996). BCT do relatively well in marginal habitats and have been found in warmer, turbid water where non-native trout cannot survive (Behnke 1992).

The project area is outside the Bonneville Basin; however, in 1960 NDOW stocked BCT in Goshute Creek, on the east slope of the Cherry Creek Range. BCT were stocked into Goshute Creek in an effort to preserve the genetically and phenotypicaly unique BCT from the nearby Snake Valley Range. To date, Goshute Creek continues to sustain a healthy, self-sustaining population of BCT, despite a high flow event in summer 2001 which was originally thought to have decimated the population (Crookshanks 2006a). BCT are a BLM sensitive species and while the population is outside of the native range of BCT, it is still considered a pure population of BCT and is managed accordingly. Additional out-of-basin stocking efforts have since ceased due to the decision by the Great Basin National Park to reestablish BCT in streams draining the park, which eliminates the need for additional refuge populations. Because the nearest occurrence and known location of BCT is approximately 5 miles to the east, this species will no longer be discussed within this EIS.

Steptoe Valley Fisheries

Aquatic habitat in Steptoe Valley includes streams, reservoirs, and springs. Within the general project area, the majority of aquatic habitat is associated with the Duck Creek system (a detailed hydrologic description is provided in **Section 3.2**) and includes Duck Creek, McGill Springs, Tailings Creek, Steptoe Creek, Egan Creek, Cherry Creek, Goshute Creek, Bassett Lake, and numerous springs. The largest spring systems are located on private land on the west side of the valley including the Lussetti Ranch/Grass Springs area, Steptoe Ranch area, and Monte Neva Hotsprings. In addition to native relict dace, various species of non-native fish have been introduced into Steptoe Valley including: common carp, largemouth bass, northern pike, and various species of trout. Further, numerous exotic species popular as aquarium pets have been released into the McGill swimming pool and have escaped into portions of McGill Spring.

Aside from relict dace, all fish species in the Duck Creek system have been introduced. This includes primarily northern pike, largemouth bass, and common carp, which were originally introduced into Bassett Lake. Due to the altered hydrology, Duck Creek from the Duck Creek Reservoir downstream to Steptoe Slough is not known to support viable fish populations. Northern pike, largemouth bass, and common carp from Bassett Lake have invaded upstream habitat in Steptoe Slough. In addition, brook trout were stocked in Tailings Creek prior to 1999

(last stocking was in 98-99), and currently there is a naturally reproducing population in Tailings Creek. Carp are also known to inhabit Tailings Creek. Fortunately, a culvert at the pumphouse appears to have prevented these species from invading habitats further upstream. As a result, upstream of the pumphouse culvert, strong relict dace populations exist in the tailings area and McGill Spring. An invasion of habitat upstream of the pumphouse, especially by northern pike, a highly piscivorous visual predator, could decimate the relict dace populations. This may be the case in Duck Creek below Bassett Lake where northern pike, largemouth bass, and carp have also spread. Recent surveys there did not find relict dace; however, it is possible that some populations may exist inside channels or tributary springs (Crookshanks 2006b). Further, recent sampling efforts did not find relict dace in either Steptoe Slough or Tailings Creek. Common carp are also known to inhabit the Steptoe and Lusetti Ranches. Steptoe Ranch also supports northern pike and largemouth bass which can be found in Monte Neva Hotsprings Complex (Crookshanks 2006a).

In addition to the species mentioned above, rainbow trout were historically stocked throughout the area. Currently, naturally reproducing populations can be found in Egan Creek and Cherry Creek. These two streams are small tributaries that drain the Egan Creek and Cherry Creek ranges, respectively. In most years these streams are isolated from each other as they, and Duck Creek, enter the alluvial aquifer prior to joining. Stocking of rainbow trout in these streams was discontinued in the mid to late 1980s due to the establishment of natural reproduction. As previously mentioned, Goshute Creek, contains an introduced population of BCT.

3.8.4 Specific Project Area Conditions

Appendix 3B displays the wildlife species observed in the project area during baseline surveys conducted in 2006 and 2007.

The following categories of wildlife inhabit and/or forage within the majority of the project area. Unless otherwise noted, they will not be discussed below under each specific Project feature.

- Bats
- Small Mammals
- Predatory Mammals
- Reptiles
- Migratory Birds
- Upland Game Birds

3.8.4.1 Plant Sites

South Plant Site

This section describes the existing conditions for the South Plant Site, the associated worker village, and the Mt. Wheeler Transmission Line.

TEPC Species

No TEPC species were observed or are known to routinely inhabit the South Plant Site, associated worker village, or the Mt. Wheeler Transmission Line corridor.

BLM Sensitive and State of Nevada Special Status Species

Sage Grouse: The South Plant Site, associated worker village, and portions of the Mt. Wheeler Transmission Line corridor are located within suitable sage grouse habitat. NDOW indicated that there was an historic lek (Glen Siding) located in the southwest corner of the South Plant

Site. However, the absence of sage grouse observations or sign has led NDOW to classify this lek as inactive in recent years. JBR surveyed the area in April 2007 and did not find any indication (pellet groups) that the lek was active or had been active recently. No other leks are located within 2 miles of the South Plant Site or the associated worker village. The North Tehama Creek Lek is inactive and is located 2 miles away from the Mt. Wheeler Transmission Line corridor on the east side of US-93. The Whiteman Creek Lek is an active lek and is located 1.7 miles away from the Mt. Wheeler Transmission Line corridor on the east side of US-93 (**Figure 3.8-2**).

Pygmy Rabbit: No pygmy rabbits or pygmy rabbit habitat was observed or is known to occur within the South Plant Site. Pygmy rabbits were observed south of the proposed access road to the associated worker village. In addition, both occupied and potential pygmy rabbit habitat exists within much of the Mt. Wheeler Transmission Line corridor (**Figure 3.8-3a**).

Raptors: Many types of raptors including hawks, owls, eagles, accipiters, and falcons currently utilize the South Plant Site, associated worker village, and the Mt. Wheeler Transmission Line for foraging activities. Ferruginous hawk nesting habitat exists approximately 1.5 miles east of the worker village (**Figure 3.8-3a**).

Western Burrowing Owl: **Figure 3.8-3a** indicates the locations of where burrowing owls were observed during baseline surveys. Two burrowing owls were observed at the South Plant Site and were flushed from active burrows in October of 2006. Mating behavior of a pair of burrowing owls was also observed in the spring of 2007 and a total of 4 owls appeared at the entrance to one of these burrows in August 2007, indicating that the mating pair had successfully reproduced.

<u>*General Wildlife*</u>

Pronghorn Antelope: The entire South Plant Site, associated worker village, and the Mt. Wheeler Transmission Line occurs within year-round pronghorn antelope range. A herd of 7 to 12 pronghorn was regularly encountered within and/or in the vicinity of the South Plant Site and larger numbers were observed during the winter of 2007 (**Figure 3.8-4a**).

Mule Deer: The Mt. Wheeler Transmission Line corridor east of US-93 is bordered to the east by mule deer crucial winter range (**Figure 3.8-4b**).

North Plant Site

This section describes the existing conditions for the North Plant Site, the associated worker village, and the Mt. Wheeler Transmission Line.

<u>*TEPC Species*</u>

No TEPC species were observed or are known to routinely inhabit the North Plant Site, associated worker village, or the Mt. Wheeler Transmission Line corridor.

<u>*BLM Sensitive and State of Nevada Special Status Species*</u>

Sage Grouse: No sage grouse range has been identified within the North Plant Site. However, the Becky Spring Lek is an active lek and is located 1.4 miles east of the north worker village on the east side of US-93 (**Figure 3.8-2**).

Pygmy Rabbit: No pygmy rabbits were observed during baseline surveys within the North Plant Site. However, suitable pygmy rabbit habitat was observed just north of the North Plant Site near the Mt. Wheeler Transmission Line (also water supply line corridor), and occupied and

potential pygmy rabbit habitat exists within much of the Mt. Wheeler Transmission Line corridor south of the North Plant Site (**Figure 3.8-3a**).

Raptors: Ferruginous hawk nesting habitat is located approximately 0.6 miles east of the North Plant Site. Many other types of raptors including hawks, owls, eagles, accipiters, and falcons currently utilize the North Plant Site, associated worker village, and the Mt. Wheeler Transmission Line for foraging activities.

Western Burrowing Owl: As shown on **Figure 3.8-3a**, no burrowing owls were observed north of what was previously described under the South Plant Site above.

<u>*General Wildlife*</u>

Pronghorn Antelope: The entire North Plant Site, associated worker village, and the Mt Wheeler Transmission Line occur within year-round pronghorn antelope range (**Figure 3.8-4a**).

Mule Deer: As described above, the Mt. Wheeler Transmission Line corridor east of US-93 is bordered to the east by mule deer crucial winter range (**Figure 3.8-4b**).

3.8.4.2 Electric Transmission Facilities

<u>*TEPC Species*</u>

The desert tortoise is the only TEPC species that is known to occur within any of the electric transmission facilities. Tortoises and their sign were recorded in Segments 9C, 9D, the southern portion of Segment 10 (alternative), Segment 11, and within the Harry Allen Substation expansion area (**Figure 3.8-1**).

<u>*BLM Sensitive and State of Nevada Special Status Species*</u>

Sage Grouse: Sage grouse habitat occurs throughout Steptoe Valley, Butte Valley, and the White River Valley. There are numerous leks within or less than 2 miles of the electric transmission facilities. **Figure 3.8-2** illustrates the location of these leks, and **Table 3.8-4** below shows the proximity of these leks to the nearest transmission line segment.

TABLE 3.8-4. SAGE GROUSE LEKS AND PROXIMITY TO ELECTRIC TRANSMISSION FACILITIES

LEK NAME	ACTIVE/ NOT ACTIVE/ HISTORIC	APPROXIMATE DISTANCE FROM THE NEAREST TRANSMISSION LINE ROW
Borchert Spring N	Active	1.2 miles from Segment 1B (Line #1)
Raiff Siding	Unknown	0.5 miles from Segment 1B (Line #1)
Log Canyon N	Active	0.1 miles from Segment 1C (Line #1)
Mud Spring N	Active	0.1 miles from Segment 1C (Line #2)
Water Canyon Bench	Unknown	0.9 miles from Segment 4A (Line #1)
Dry Canyon 3	Unknown	1.3 miles from Segment 4A (Line #2)
Dry Canyon	Unknown	0.6 miles from Segment 4A (Line #1)
Dry Canyon 2	Active	1.3 miles from Segment 4A (Line #2)
Dry Canyon Road	Unknown	2.0 miles from Segment 4A (Line #2)
Glenn Siding	Historic	0.6 miles from Segment 4A (Line #1)
Heusser Mountain E	Historic	0.2 miles from Alternative Segment 3 (Line #1)
McGill Junction	Unknown	Within Alternative Segment 3 (Line #2)
Butte Valley SE	Unknown	1.2 miles from Segment 1D (Line #2)
South Butte Valley 2	Inactive	0.1 miles from Segment 1D (Line #2)
South Butte Valley 3	Inactive	0.4 miles from Segment 1D (Line #1)

LEK NAME	ACTIVE/ NOT ACTIVE/ HISTORIC	APPROXIMATE DISTANCE FROM THE NEAREST TRANSMISSION LINE ROW
Blackjack W	Unknown	1.8 miles from Segment 6C (Line #2)
Gardner Ranch N	Unknown	0.3 miles from Segment 6C (Line #2)
Ellison Creek N	Active	0.5 miles from Segment 6C (Line #1)
Ellison Creek N N	Inactive	Within Segment 6C (Line #2)
Runway	Unknown	0.3 miles from Segment 6C (Line #2)
Ellison Creek	Inactive	1.0 miles from Segment 6C (Line #2)
Ellison Knobs	Unknown	1.7 miles from Segment 6C (Line #2)
White River	Active	0.2 miles from Segment 6C (Line #2)

Pygmy Rabbit: Pygmy rabbits or their sign were recorded in Segments 3 (alternative), 4A, 1D and 6C (**Figures 3.8-3a and 3.8-3b**).

Raptors: Many species of raptors utilize the diversity of habitats that exist throughout all of the electric transmission line segments (**Figures 3.8-3a and 3.8-3b**). Segment 1C is adjacent to goshawk nesting habitat and the junction of Segments 4A and 1D is located adjacent to and within goshawk nesting habitat. Two separate sections of Segment 6C are situated within ferruginous hawk nesting habitat. During baseline surveys, unidentified cliff nests were discovered south of Segment 6C (Line #1) in the Gap Mountain area. The Robber's Roost Hills in Segment 8 is a particularly active raptor nesting area; in addition to several stick nests, two fledgling peregrine falcons were observed here. A golden eagle fledgling was observed sitting on a nest within the northwestern portion of Segment 10 (alternative) and an active golden eagle nest was observed in Segment 8.

Western Burrowing Owl: Burrowing owls were observed at two separate locations near the location where the southern end of Segment 4A enters the South Plant Site (**Figure 3.8-3a**). A burrowing owl was also observed in the northern portion of Kane Spring Valley, near Segment 10 (alternative). Burrowing owls likely forage within the diversity of habitats that exist throughout much of the transmission line ROWs.

Banded Gila Monster: This species is known to occur in Clark and Lincoln Counties and occupies the same general habitat as the desert tortoise (**Figure 3.8-1**). However, due to the elusive nature of the Gila monster very few sitings have been recorded. Baseline surveys for desert tortoise were conducted in Segments 9D 10 and 11, which are located within potential Gila monster habitat.

Terrestrial Invertebrates: The dark sandhill skipper, the Steptoe Valley crescentspot, and the White River wood nymph have the potential of occurring near Segment 4A and Segment 3 (alternative). Specifically, the dark sandhill skipper has been recorded near Steptoe Slough and Warm Springs (along Duck Creek). The Steptoe Valley crescentspot has been recorded near Bassett Lake, Steptoe Slough, and Warm Springs (along Duck Creek). The White River wood nymph has been recorded near Warm Springs (**Figures 3.8-3a and 3.8-3b**).

Aquatic Invertebrates: Several sensitive aquatic species have been located within Steptoe Valley (**Figure 3.8-3a and 3.8.3b**). The majority of these species are located in isolated springs situated on the eastern foothills of the Egan Range and are not in close proximity to any of the proposed transmission lines.

General Wildlife

Pronghorn Antelope: With the exception of some higher elevation areas, pronghorn year-round range exists within all electric transmission line segments that are north of Segments 9C and 9A (**Figure 3.8-4a**).

Mule Deer: Several transmission line segments pass through mule deer winter range, summer range, and crucial winter range (**Figure 3.8-4b**). **Table 3.8-5** below indicates which transmission line segments are within and/or adjacent to mule deer crucial winter range.

TABLE 3.8-5. MULE DEER CRUCIAL WINTER RANGE PROXIMITY TO TRANSMISSION LINE SEGMENTS

TRANSMISSION LINE SEGMENT	PROXIMITY TO TRANSMISSION LINE SEGMENT
Segment 1C	Portions within crucial winter range located on the eastern foothills of the Egan Range
Segment 1D	Portions within crucial winter range located on the eastern foothills of the Egan Range
Segment 4A	Portions within crucial winter range where Segment 4A and 1D merge on the eastern foothills of the Egan Range
Segment 3 (Alt)	Adjacent to crucial winter range in the Bassett Lake Area
Segment 6C	Adjacent to crucial winter range where Segment 6C intersects Highway 6
Segment 6C	Portions within crucial winter range near Wells Station in the Grant range
Segment 6C	Adjacent to crucial winter range near the northern toe of the Golden Gate Range
Segment 6C	Portions within crucial winter range of Silver King Pass on the Schell Creek Range
Segment 8	Portions within crucial range surrounding the Bristol Wells area.
Segment 8	Adjacent to crucial range along the westernslope of the Highland range

Rocky Mountain Elk: There is no elk crucial winter or crucial summer range within the project area. Several transmission line segments pass through elk year-round range (**Figure 3.8-4c**). **Table 3.8-6** below indicates which transmission line segments are within and/or adjacent to elk year-round range. Elk sign was numerous in the vicinity of the Robinson Summit Substation and the Silver King Pass portion of Segment 6C.

TABLE 3.8-6. ELK YEAR-ROUND RANGE PROXIMITY TO TRANSMISSION LINE SEGMENTS

TRANSMISSION LINE SEGMENT	PROXIMITY TO TRANSMISSION LINE SEGMENT
Segment 1B	Portions within year-round range located on the eastern foothills of the Egan Range
Segment 1C	Within year-round range located on the eastern foothills of the Egan Range
Segment 4A	Portions within year-round range where Segment 4A and 1D merge on the eastern foothills of the Egan Range
Segment 1D	Portions within year-round range over the Egan Range and near Robinson Summit
Segment 6C	Portions within year-round range between Robinson Summit and Wells Station in the Grant range
Segment 6C	Portions within year-round range of Silver King Pass on the Schell Creek Range
Segment 10	Portions within year-round range in the Meadow Valley Mountains

Bighorn Sheep: No occupied Rocky Mountain bighorn sheep range is located near any of the transmission line ROWs and only a small portion of Segment 1D (in the Butte Mountains) is situated near potential Rocky Mountain bighorn sheep range. Several transmission line segments pass through occupied and potential desert bighorn sheep range (**Figure 3.8-4d**). **Table 3.8-7** below indicates which transmission line segments are within and/or adjacent to occupied desert bighorn sheep range. However, the Egan and Schell Creek Ranges surrounding Ely is a habitat convergence zone for the two subspecies of bighorn. Although the

Egan Range north and west of Ely is classified by NDOW as potential desert bighorn sheep range, two bighorn sheep rams were observed near the Hercules Gap fissure during baseline surveys in 2006. Surveyors were unable to determine the distinct species of the rams observed.

TABLE 3.8-7. OCCUPIED DESERT BIGHORN RANGE PROXIMITY TO TRANSMISSION LINE SEGMENTS

TRANSMISSION LINE SEGMENT	PROXIMITY TO TRANSMISSION LINE SEGMENT
Segment 6C	Portions within occupied range surrounding Silver King Pass of the Schell Creek Range
Segment 9A	Within occupied range
Segment 9C	Within occupied range
Segment 10	Portions within occupied range of the Delamar Mountains
Segment 10	Adjacent to occupied range along the western foothills of the Meadow Valley mountains
Segment 11	Portions within occupied range of the Arrow Canyon Range

Waterfowl: Three key waterfowl areas have been identified within the transmission line ROWs. Segment 3 is located adjacent to Bassett Lake and crosses over the Steptoe Slough area. Segment 6C passes south of the southern portion of the Kirch Wildlife Management Area and the northern portion of Segment 9D passes less than a thousand feet from the Pahranagat National Wildlife Refuge.

3.8.4.3 Water Supply Facilities

<u>TEPC Species</u>

No TEPC species were observed or are known to routinely inhabit any of the water supply facilities.

<u>BLM Sensitive and State of Nevada Special Status Species</u>

Sage Grouse: Sage grouse habitat exists throughout much of the Water Supply Facilities area (**Figure 3.8-2**). **Table 3.8-8** below indicates which water supply component(s) are within 2 miles of sage grouse leks.

TABLE 3.8-8. SAGE GROUSE LEKS AND PROXIMITY TO WATER SUPPLY FACILITES

LEK NAME	ACTIVE/ NOT ACTIVE/ HISTORIC	PROXIMITY TO WATER SUPPLY FACILITIES
Becky Spring	Active	2.0 miles from the Lages Station Well Field
N Tehama Creek	Inactive	2.0 miles from the Lages Station Water Line / Middle Well Field
Whiteman Creek	Active	1.7 miles from the Lages Station Water Line / Middle Well Field
Dry Canyon	Unknown	1.8 miles from the South Well Field
Paine Springs	Historic	0.8 miles from the Duck Creek Water Impoundment
Glenn Siding	Historic	1.5 miles from the South and Limited South Well Fields

Pygmy Rabbit: Pygmy rabbit sign was recorded along the majority of the water supply line between the Lages Station Well Field and the South Plant Site (including the Middle, South, and Limited South Well Field Alternatives). Portions of the Coyote Valley Ranch Well Field Alternative are also situated within suitable pygmy rabbit habitat (**Figure 3.8-3a**).

Raptors: Many species of raptors forage within the diversity of habitats that exist throughout all of the water supply facilities (**Figures 3.8-3a**). No known raptor nesting areas are located within close proximity to any of the water supply facilities.

Western Burrowing Owl: Burrowing owls were observed at two separate locations near the South Well Field Alternative (**Figure 3.8-3a**). And burrowing owls likely forage within the diversity of habitats that exist throughout all of the water supply facilities.

General Wildlife

Pronghorn Antelope: **Figure 3.8-4a** shows that all of the water supply facilities and alternatives occur within year-round pronghorn range.

Mule Deer: Much of the Alternative Duck Creek Water Pipeline corridor occurs within mule deer crucial winter range (**Figure 3.8-4b**).

Waterfowl: Several species of waterfowl have been identified in the Duck Creek area and utilize the existing impoundment.

3.8.4.4 Rail Facilities

TEPC Species

No TEPC species were observed or are known to routinely inhabit any portions of the rail leads or the Alternative Rail Line.

BLM Sensitive and State of Nevada Special Status Species

Sage Grouse: Various forms of sage grouse habitat (nesting, summer, or winter range or a combination) occur within the majority of the project area for the Alternative Rail Line and the rail leads (**Figure 3.8-2**). **Table 3.8-9** below indicates which water supply feature(s) are within 2 miles of sage grouse leks.

TABLE 3.8-9. SAGE GROUSE LEKS AND PROXIMITY TO RAIL FACILITIES

LEK NAME	ACTIVE/ NOT ACTIVE/ HISTORIC	PROXIMITY TO RAIL FEATURES
N Tehama Creek	Inactive	2.0 miles from the Alternative Rail Line
Whiteman Creek	Active	1.7 miles from the Alternative Rail Line
Dry Canyon	Unknown	1.8 miles from the Alternative Rail Line
Glenn Siding	Historic	Within the South Plant Site Rail Lead

Pygmy Rabbit: Abundant pygmy rabbit habitat exists within the Alternative Rail Line between the North and South Plant Sites. One recorded sign of pygmy rabbits was observed along the proposed Alternative Rail Line at approximately 15 miles north of US-93A. Suitable pygmy rabbit habitat also exists near the junction of the proposed Alternative Rail Line and the NNRy rail lead to the North Plant Site (**Figure 3.8-3a**).

Raptors: Many species of raptors forage within the diversity of habitats that exist throughout all of the rail facilities (**Figures 3.8-3a**). No known raptor nesting areas are located within close proximity to any of the rail facilities.

Western Burrowing Owl: Burrowing owls were observed at two separate locations near the junction of the Alternative Rail Line and the NNRy rail lead into the South Plant Site (**Figure 3.8-3a**). Other Sensitive species, especially avian species, most likely use the existing habitats within the project area for these components.

General Wildlife

Pronghorn Antelope: **Figure 3.8-4a** shows that both rail leads and the entire Alternative Rail Line corridor occurs within year-round pronghorn range.

3.9 Range Resources

While not as numerous as the cattle herds of the Great Plains, the livestock industry is important to Nevada history. Ranching has been a part of Nevada since Europeans first settled along the Carson River to support and take advantage of the growing number of immigrants using the California Trail. Some of the first ranches in Nevada were located at Carson City (first known as Eagle Ranch), Genoa (first known as Mormon Station), and Sheridan, NV (Shown 2007).

As was also common in the rest of the West, the drought of the 1930s exacerbated poor grazing practices that had been slowly deteriorating much of the grazing land in this already dry climate. The Taylor Grazing Act of 1934 was passed by Congress to help reduce the impact of previous overgrazing on public lands, and put in place a system to regulate grazing on these lands by requiring permits and fees. The BLM regulates grazing on public lands through the use of grazing allotments.

Nevada is divided up into six grazing districts (BLM 2007b). Within the BLM's Ely District there are 242 grazing allotments. The Elko District has 245 allotments, and the Southern Nevada District has approximately 63 allotments, although only five of these are open for grazing. Of these 550 allotments, 51 are within the EEC project area, although not all of these would be affected (see **Figures 3.9-1a – 3.9-1c**). These 51 allotments are open rangelands that have the potential to be used periodically, at various intensities, for livestock grazing.

In addition, wild horses inhabit much of the rangeland within the project area. These horses are descendents of Spanish horses brought to the Americas over 500 years ago, or are feral horses released to rangelands as recently as the mid-20th century by cavalrymen, miners, and ranchers (BLM 2007c). Wild horses are protected by the Wild Free-Roaming Horses and Burros Act of 1971 (Public Law 92-195, as amended). Nevada has 102 Herd Management Areas (HMAs) covering 22,681,326 acres, 86 percent of which are federally owned. Horses are actively managed in HMAs to maintain herd health and the health of rangelands (BLM 2007c). Of these 102 HMAs, 10 are within the EEC project area, although not all of these would be affected (see **Figure 3.9-2**).

3.9.1 Area of Analysis

The area of analysis includes the proposed disposal area for the plant sites and ROWs for all project elements, including alternatives, considered in the direct impact area and discussed in Chapter 2. The indirect impact area includes the entirety of any allotment or HMA directly affected by the project.

3.9.2 Data Sources and Methods

The following indicators were considered when describing the affected environment for range resources:

- Vegetation and forage production within the direct affects area
- Number of livestock allotments or HMAs that have one or more elements of the EEC project situated within them, and the numbers of livestock or horses currently using, or approved to use, these areas
- Locations of water sources, springs, and other range improvements in relation to the direct affects area

Vegetation and forage production information is based on Natural Resource Conservation Service (NRCS) summary data found in the Web Soil Survey, Soil Data Explorer – Range Productivity Information, located at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx (USDA 2007c), as well as original vegetation data presented **Section 3.7**.

Each livestock allotment or HMA that has portions of EEC elements within them is included in the descriptions below. The acreage of the allotment or HMA is provided, as well as the number of animals using these lands. Additional information about the location of the allotment or HMA relative to roads, water sources, human settlements, or period of use is also included where information was available.

Information about water sources, springs, and other range improvements was gathered from existing BLM data regarding livestock watering facilities, the Nevada State Engineer's Office website (http://water.nv.gov) (NDWR 2006), and seep, spring, and stream survey data collected for this EIS, which is presented in **Section 3.2.3.2**.

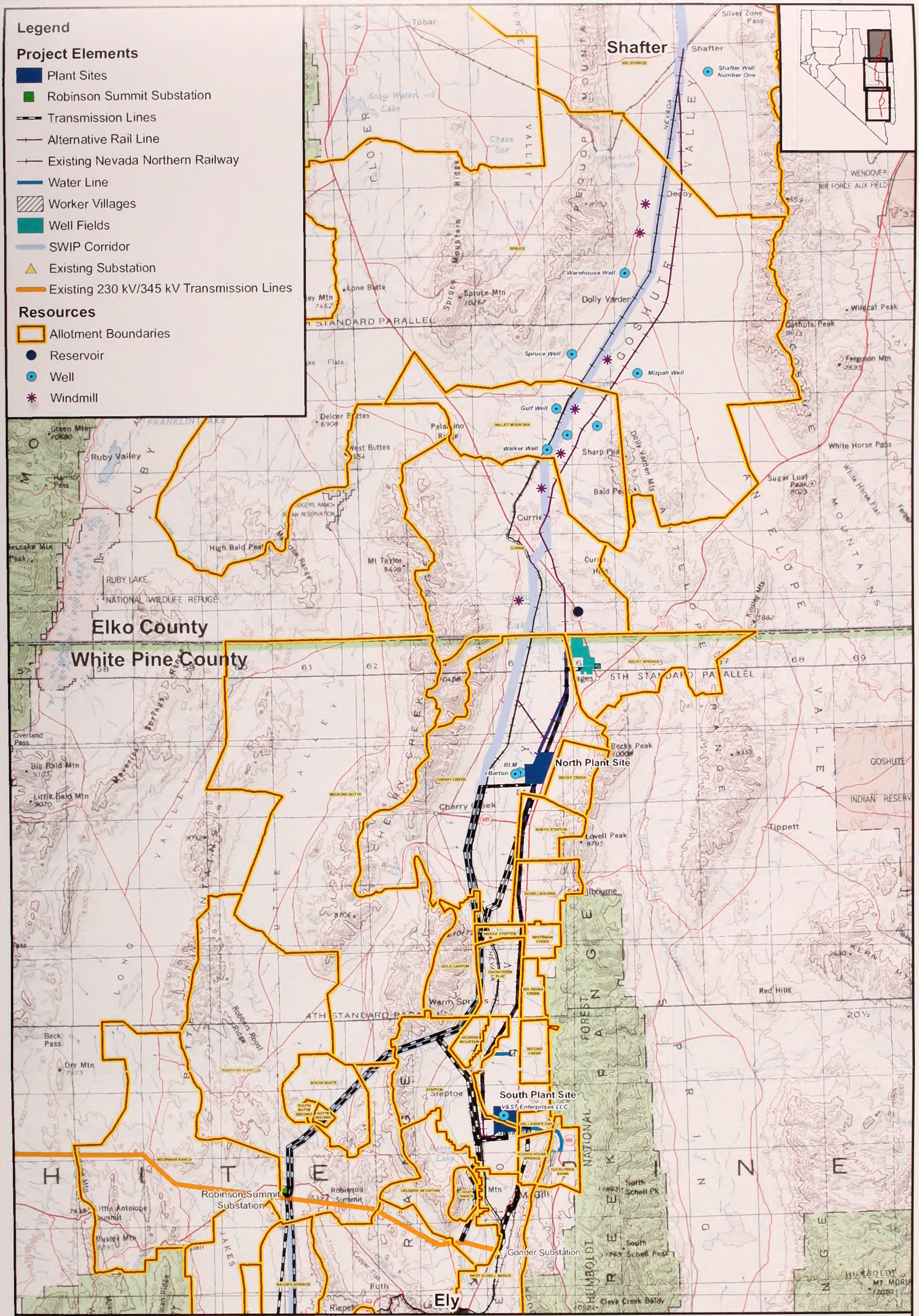
3.9.3 Existing Conditions

The proposed EEC and its components would be constructed on a landscape dominated by rangelands in an arid area receiving 5 to 14 inches of precipitation per year (see **Table 3.6-2**). Most of these lands are managed by the BLM and are divided into grazing allotments used principally for cattle grazing, some sheep grazing, and wildlife habitat.

The 51 allotments in the project area are leased by one or a group of ranchers and a rancher may utilize several allotments over the year. In the project area, these allotments are generally available for grazing year-round. The BLM manages the number of livestock on the allotment by tracking Animal Unit Months (AUMs). An AUM is the amount of forage required to maintain a cow, cow and calf less than six months old, a bull, or five sheep, for one month. Forage includes those plant species that are palatable to grazing animals. In Nevada, an AUM is the equivalent of 1,000 pounds of dried forage. The BLM determines the number of AUMs available on each allotment based on forage studies and other evaluations of rangeland health.

For the purposes of this EIS, the total vegetation production and available forage in pounds per acre was determined for the two plant sites and a selection of other areas within the direct effects area. These values were determined by looking up vegetation and forage production rates for the appropriate NRCS Ecological Site. An Ecological Site is "a distinctive kind of land with specific characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation" (NRCS 2003). All rangelands in Nevada have been characterized into an Ecological Site, which correlates to a specific soil type (soil survey map unit). Both soil survey data and Ecological Site Description (ESD) information are collected and maintained by the NRCS (See http://esis.sc.egov.usda.gov/ESIS/About.aspx).

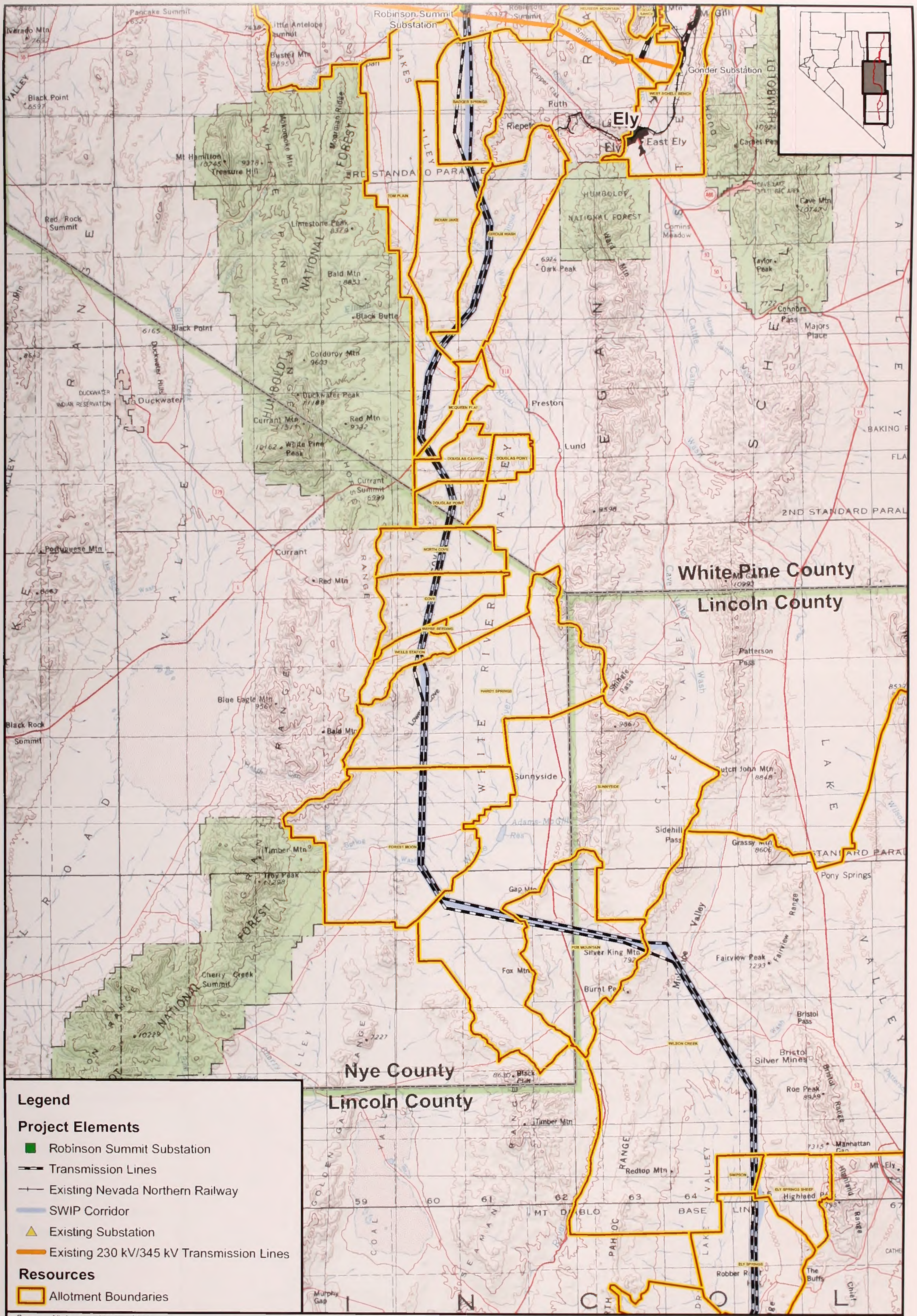
Total vegetation and forage production rates for common Ecological Sites found in the direct effects area are shown in **Table 3.9-1**.



Source - Allotments: Nevada BLM
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno).

1:500,000
10 0 10 Miles
10,000 0 10,000 Meters
Scale is 1:500,000 when printed at 11"x17"

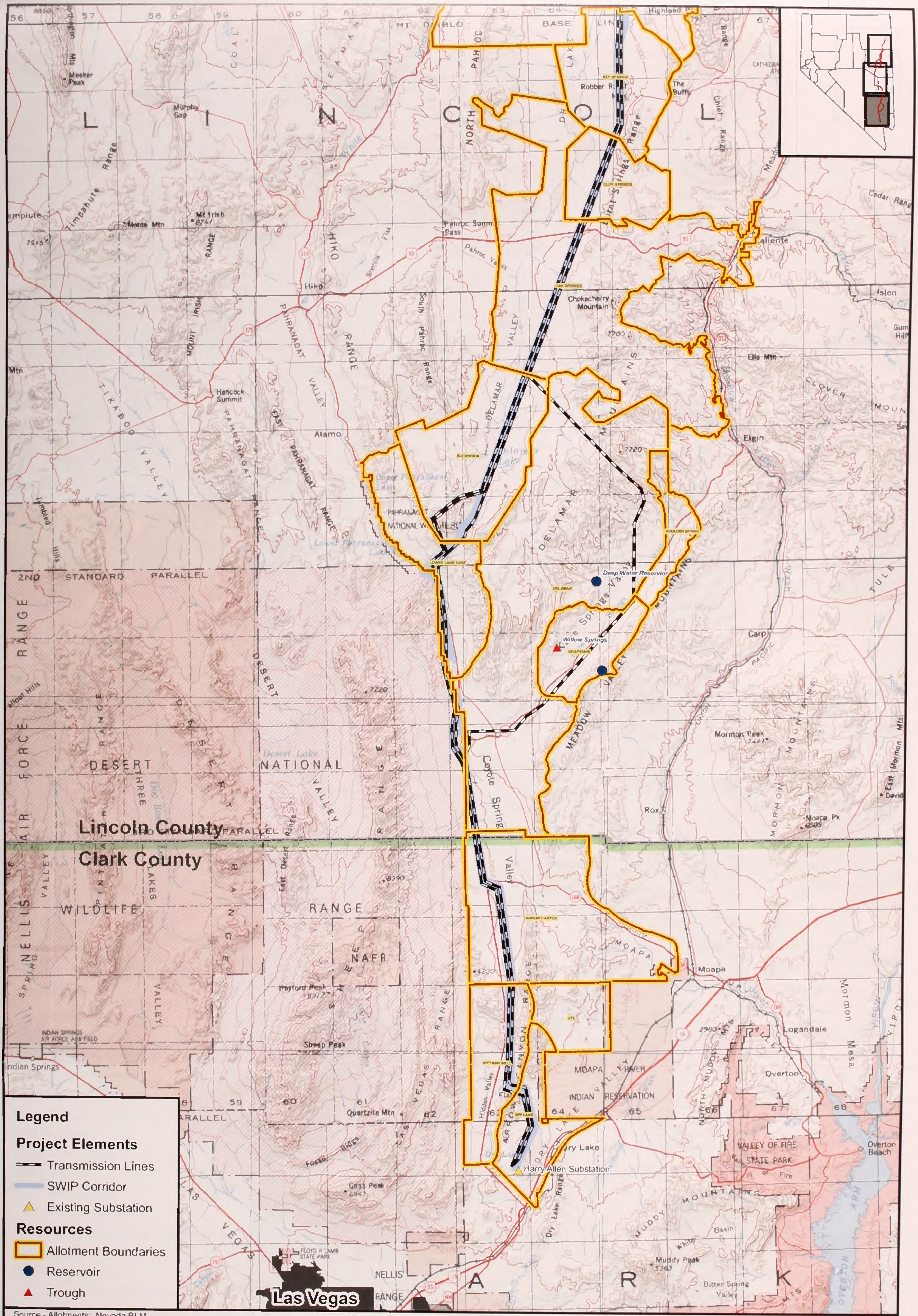
FIGURE 3.9-1a
ALLOTMENT RESOURCES
ELY ENERGY CENTER



Source - Allotments: Nevada BLM
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno).

Scale is 1:500,000 when printed at 11"x17"

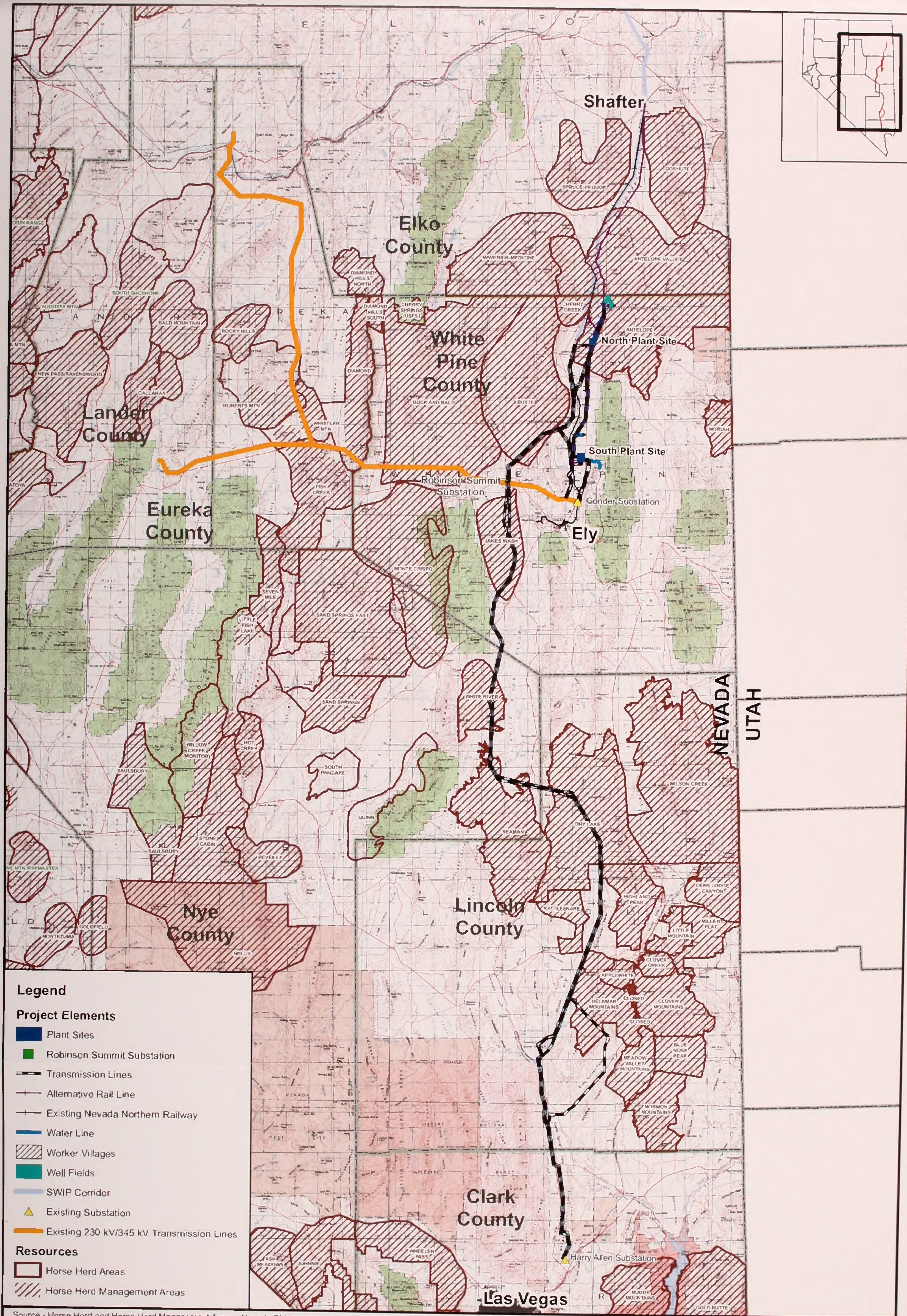
FIGURE 3.9-1b
ALLOTMENT RESOURCES
ELY ENERGY CENTER



Source - Allotments: Nevada BLM
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno).

Scale is 1:500,000 when printed at 11"x17"

FIGURE 3.9-1c
ALLOTMENT RESOURCES
ELY ENERGY CENTER



Source - Horse Herd and Horse Herd Management Areas: Nevada BLM
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno).

FIGURE 3.9-2
HERD MANAGEMENT AREAS
ELY ENERGY CENTER

TABLE 3.9-1. SELECTED ECOLOGICAL SITES IN THE PROJECT AREA AND THEIR LONG-TERM VEGETATIVE AND FORAGE PRODUCTION RATES

ECOLOGICAL SITE NAME	TOTAL ANNUAL AIR-DRY PRODUCTION (LBS/ACRE): VEGETATION / FORAGE		
	GOOD YEAR	AVERAGE YEAR	POOR YEAR
Coarse Gravelly Loam, 6-8" P.z.* (028BY075NV) Example: South Plant Site – Zerk map unit	700/434	500/310	300/186
Gravelly Clay, 10-12" P.z. (028BY086NV) Example: Robinson Summit – Yody series	800/360	650/293	350/158
Loamy Fan, 8-12" P.z. (028BY045NV) Example: South Plant Site – Tulase map unit	1,000/450	800/360	600/270
Shallow Calcareous Hill, 10-14" P.z. (028BY059NV) Example: Electric Transmission Line, Segment 6C–Tecomar map unit	400/140	250/88	125/44
Sodic Terrace, 5-8" P.z. (028BY074NV) Example: Just S. of Lages Station – Katelana map unit	600/90	400/60	200/30
Wet Meadow, 10-14" P.z. (028BY01NV) Example: W. of McGill – Devilsgait map unit	4,000 / 2,400**	2,000 / 1,680**	1,200 / 1,200**
Alkali Silt Flat (028BY97NV) Example: Alternative Rail Line near S, End of Pequop Range – Ragtown map unit	500/75	350/53	200/30

Source: NRCS Undated. http://websoilsurvey.nrcs.usda.gov/app/. Includes data from soil surveys for Lincoln County, South Part; Nye County, NE Western White Pine County Area, Parts of White Pine and Eureka Counties; and Elko County, SE Part;
*P.z. = precipitation zone
** High productivity associated with proximity to streams and wetlands

Total vegetation production is the sum of the air-dry weight of all vegetation growing on an acre of land, determined by sampling the vegetation. Forage production is a sub-set of vegetation production and includes production only of perennial grasses and winterfat. The total pounds of vegetation production or forage production per acre is multiplied by 50 percent to assure that enough forage is left to maintain rangeland health. The adjusted production figure is multiplied by the number of acres to get total forage production for a portion of, or an entire allotment. Dividing the pounds production per acre by 1,000 pounds per AUM gives the number of AUMs for a particular area of land. In the project area, it takes several acres to provide one AUM (BLM 2007b). Range improvements, which help to better distribute cattle to take full advantage of the forage resource, occur throughout allotments.

The project area also contains 10 Horse Management Areas (HMAs). HMAs are managed with Appropriate Management Levels (AMLs). AMLs are defined as the number of wild horses or burros that can be sustained within a designated HMA while maintaining a natural ecological balance, in keeping with the multiple-use management concept for the area (National Wild Horse Association 2007). The BLM determines the appropriate number of wild horses and burros that each herd management area can support through intensive land use management planning efforts, including range forage inventory and requests for input from the public (BLM 2007c). AMLs are adjusted on a yearly basis. For the purposes of this EIS, AML data from March 2007 were used.

Vegetation in the project area is generally dominated by shrubland species. The most common shrub species are big sagebrush, Douglas rabbitbrush, black sage, winterfat, greasewood in the north and central portions of the project area, with blackbrush, and creosote bush becoming more common as one moves southward. Two low tree communities also occur: pinyon-juniper woodlands at higher elevations in the north and Joshua tree forests at low to mid elevations in

the south. Grasses are a minor or sub-dominant component of these communities, or are dominant in the uncommon hydrophyllic plant communities identified in the project area: alkaline meadows, wetlands, and riparian zones. Common grasses in the project area include Indian ricegrass, various needlegrasses, alkali sacaton, Sandberg bluegrass, bluebunch wheatgrass, basin wildrye, and alkali saltgrass, as well as sedges and rushes in seasonally wet areas. Shrub communities are often a complex of the species noted above, although areas with only one to a few species are relatively common. For example, islands of winterfat monocultures grow on silty soils on alluvial fans between Wyoming big sagebrush-dominated communities. Salt desert shrub communities consist of only salt-tolerant species and grow near valley bottoms. Grass-rich areas, plant communities located near water, and the areas of winterfat monocultures are important forage areas to livestock and horses as these species are palatable, productive, and nutritious. Sagebrush is also important to many wildlife species as browse and cover.

Although the landscape is arid, numerous springs outcrop at the base of the mountains to create isolated wet and sometimes saline meadows. Some of these springs are used as water sources for livestock.

As **Table 3.9.1** above shows, vegetation and forage availability varies significantly with proximity to water, soil depth, and texture. Allotments and HMAs may contain several different ecological sites. Therefore, some portions of allotments or HMAs may have good forage while others have poor forage.

Water is also a variable resource. Some allotments and HMAs have several springs and/or developed water sources. Others may have only one water source. Cattle and horses move up to several miles a day to reach good forage and good water, and will often congregate around water sources or on high, breezy ground (Griffith 1999).

Natural mortality rate information for cattle is unavailable. Causes of mortality include disease, animal predation, weather-related stress, or collisions with vehicles. In a typical cow-calf operation, mother cows produce one calf per year. Cows that don't produce a calf are generally sold. Depending on the operation, mother cows are kept for 4 to 7 years, steers are kept for 6 to 18 months, and female calves are either sold with the steers or kept to replace older mother cows. Very few male calves are kept as bulls.

Horses have an average mortality rate of about 5 percent per year and a herd growth rate of about 20 percent per year. Populations are kept in check by rounding up the horses and auctioning them off every few years. Any unsold horses and/or foals are sent to farms in the central U.S. and sold at a later date (Noyes 2007).

3.9.4 Specific Project Area Conditions

3.9.4.1 Plant Sites

Two sites are being considered for the power plant location: the South Plant Site and the North Plant Site. Either would require approximately 3,000 acres of land, with 2,500 acres of the land being acquired through a BLM land disposal and the remaining acres controlled with BLM ROWs.

Grazing Allotments
The South Plant Site is located in two allotments: the Duck Creek Flat Allotment and the Steptoe Allotment (See **Figure 3.9-1a**). Both of these allotments have individual permittees and the rangeland within these allotments is important to the permittees' overall operations because they are close to the permittees' ranches and they are available for use throughout the year, though they are not grazed year-long (Wilson 2007). These allotments contain several fences

and pastures that can be used for managing cattle more intensively than the larger, unpastured allotments located further from McGill and Ely. Management may include calving, branding, gathering for shipping, and other chores. The acreage of the Duck Creek Flat and Steptoe allotments and the number of AUMs in each allotment are listed in **Table 3.9-2**.

The North Plant Site would be located in the southeastern corner of the Cherry Creek Allotment. The Cherry Creek Allotment is shared by several permittees (Wilson 2007). The acreage of the Cherry Creek allotment and the number of AUMs in this allotment are listed in **Table 3.9-2**.

In addition to the allotments that occur at the two power plant sites, up to six additional allotments occur within the proposed Mt. Wheeler Transmission Line ROW as described in Chapter 2.

TABLE 3.9-2. ALLOTMENTS THAT ARE LOCATED AT THE PLANT SITES AND WITHIN THE MT. WHEELER TRANSMISSION LINE ROW

PROJECT ELEMENT	ALLOTMENT	TOTAL ACRES IN ALLOTMENT	AUMS IN ALLOTMENT
South Plant Site (Proposed)	Duck Creek Flat	37,337	1,321
	Steptoe	58,121	4,525
Mt. Wheeler Transmission Line from Gondor Substation to South Plant Site	West Schell Bench	50,279	1460
	Schoolhouse Springs	6,656	191
	Gallagher Gap	3,900	169
North Plant Site Alternative	Cherry Creek	173,205	7,040
Mt. Wheeler Transmission Line - northward from South Plant Site to Lages Station	Steptoe	58,121	4,525
	Duck Creek Flat	37,337	1,321
	Middle Steptoe	3,697	173
	Schellbourne	17,985	799
	North Steptoe	15,606	700
	Cherry Creek	173,206	7,040

All allotments are cattle allotments unless otherwise stated. AUM Data from Wilson (2007).

HMAs

The South Plant Site is not within an HMA. The North Plant Site is within the Antelope HMA in the Ely BLM district.

<u>*Antelope HMA*</u>

This HMA is 400,333 acres in size, 98 percent of which is public land (See **Table 3.9-3**). It has an estimated horse population of 280, with a target population of 324 horses (BLM 2007d). This HMA spans Steptoe Valley including Duck Creek, and extends eastward to the Utah border. It is bounded on the west by the NNRy. The White Pine County line forms the eastern and northern borders for BLM management purposes. The Schell Creek Range and Antelope Mountains are within this HMA. A fence runs the length of US-93 through the Antelope HMA, prohibiting horse movement across this highway (BLM 2007e).

Access to the Antelope HMA is provided by US-93 and various state highways, dirt roads, and trails. The only significant human settlement in the vicinity is the community of Cherry Creek. Other human settlements include a few small ranches (BLM 2007e).

There are no wild burros in the project area.

TABLE 3.9-3. HMAS WITHIN THE PROJECT AREA OF THE PLANT SITE FACILITIES FOR THE EEC

PROJECT ELEMENT	HORSE MANAGEMENT AREA	TOTAL ACRES IN HMA	AML*	POPULATION ESTIMATE
South Plant Site (Proposed)	None	None	None	None
North Plant Site (Alternate)	Antelope	400,333	324	280

Data are from Ely District Wild Horse Herd Management Areas, March 1, 2007 Population Estimate, received via email from BLM Ely office June, 2007.
*AML = Appropriate Management Level

Vegetation and Forage Production

Information taken from **Table 3.5-4** (Soils section) indicates that the South Plant Site is made up of soils from a single soil association: the Zerk-Heist-Tosser Association. The NRCS Web Soil Survey for Western White Pine County (NRCS 1988) states that Zerk and similar soils make up 55 percent of the map unit, while Heist and Tosser soils make up 15 percent each of the map unit. This soil association consists of alluvial soil that is characteristically very deep and well drained with very slow to medium runoff, and is made up of Coarse Gravelly Loam 6-8" P.z. (028BY075NV), Coarse Silty 6-8" P.z. (028BY084NV), and Shallow Calcareous Slope 8-10" P.z. (028BY11NV) Ecological Sites. According to NRCS rangeland productivity data for these ecological sites (NRCS Undated), Indian ricegrass, winterfat, and shadscale are the most common species on the Zerk and Heist soils, with black sage, Indian ricegrass, and needleandthread being most common on the shallower Tosser soils.

The North Plant Site is made up of the Pyrat-Linoyer association (Loamy 8-10"' P.z. (028BY010NV) and Silty (028BY0013NV) Ecological Sites), the Automal-Wintermute soil association (Shallow Calcareous Slope 8-10 P.z. (028BY011NV) and Coarse Gravelly Loam 6-8" P.z. (028BY075NV) Ecological Sites) and the Kunzler-Sycomat soil association (Sodic Terrace Ecological Site 8-10" P.z. (028BY028NV)). According to NRCS rangeland productivity data for these ecological sites (NRCS Undated), Wyoming big sagebrush, black sagebrush, Indian ricegrass, and needleandthread are common on loamy soils, and winterfat is common on silty soils and coarse gravelly loams, while the lower-elevation sodic terrace areas are dominated by greasewood, shadscale, big sagebrush, and basin wildrye. The most productive of these is the Loamy Ecological Site found on Pyrat soils, which support Indian ricegrass and needleandthread. The least productive are Shallow calcareous loams and Sodic Terraces of the Automal and Kunzler soils which support salt desert shrub vegetation.

Table 3.9-4 below shows the typical total vegetation and total forage production per acre for good, fair, and poor years and the dominant species for the ecological sites that occur on the plant sites.

TABLE 3.9-4. VEGETATION AND FORAGE PRODUCTION RATES FOR THE NORTH & SOUTH PLANT SITES

ECOLOGICAL SITE/SOIL SERIES	TOTAL ANNUAL AIR-DRY PRODUCTION (LBS/ACRE): VEGETATION / FORAGE			DOMINANT VEGETATION BY COVER PERCENTAGE
	GOOD YEAR	AVERAGE YEAR	POOR YEAR	
NORTH PLANT SITE				
Soil Map Unit Number/Name: 189 – Pyrat-Linoyer association: 316.0 ac (38% of North Plant Site)				
Loamy, 8-10 P.z.* (028BY010NV) Pyrat (70% of soils in assoc.)	800/300	600/250	400/200	Wyoming big sagebrush 25% Indian ricegrass 20% Needleandthreadgrass 10%
Silty 8-10 P.z. (028BY014NV) Linoyer (15% of soils in assoc.)	700/490	500/350	350/245	Winterfat 40% Indian ricegrass 20% Bottlebrush squirreltail 5%
Soil Map Unit Number/Name: 373 – Automal-Wintermute association: 1517.6 ac (51% of North Plant Site)				
Shallow Calcareous Loam 8-10 P.z. (028BY011NV) Automal (65% of soils in assoc.)	600/270	450/203	250/113	Black sagebrush 30% Indian ricegrass 25% Needleandthread 5%
Coarse Gravelly Loam 6-8 P.z. (028BY075NV) Wintermute (20% of soils in assoc.)	800/360	500/260	300/156	Indian ricegrass 40% Shadscale 25% Winterfat 5%
Soil Map Unit Number/Name: 1120 – Kunzler-Sycomat association: 1135.8 ac (11% of North Plant Site)				
Sodic Terrace 8-10 P.z. (028BY028NV) Kunzler (55% of soils in assoc.)	800/200	600/150	700/490	Black greasewood 35% Big sagebrush 20% Basin wildrye 15%
Sodic Terrace 5-8 P.z. (028BY074NV) Sycomat (30% of soils in assoc.)	600/90	400/60	200/30	Shadscale 40% Black greasewood 25% Bud sage 5%
SOUTH PLANT SITE				
Soil Map Unit Number/Name: 160 – Zerk -Heist-Tosser Association: 2970.0 ac (100% of South Plant Site)				
Coarse Gravelly Loam Ecological Site, 6-8" P.z.* (028BY075NV) Zerk (55% of map unit)	700/434	500/310	300/186	Indian ricegrass 40%, Shadscale 25% Winterfat 5%
Coarse Silty Ecological Site, 6-8 P.z. (028BY084NV) Heist (15% of map unit)	900/675	700/525	400/300	Indian ricegrass 40% Winterfat 25% Budsage 5%
Shallow Calcareous Slope Ecological Site, 8-10 P.z. (028BY016NV) Tosser (15% of map unit)	350/140	225/90	100/40	Black Sagebrush 40% Indian ricegrass 15% Needleandthread 10%

Source: NRCS Undated. From NRCS soil surveys, accessed at: http://websoilsurvey.nrcs.usda.gov/app/. Includes data from soil surveys for Lincoln County, Nevada, South Part; Nye County, Nevada Northeast Part; Western White Pine County Area Nevada, Parts of White Pine and Eureka Counties; and Elko County, Nevada, Southeast Part; All surveys are from Web Soil Survey 2.0 Accessed July 17 and August 9, 2007.

Water Wells

There are three known stock-watering facilities located within the two plant site areas. One well, located in T24N, R64E, Section 16 is just west of the proposed North Plant Site. A second well located in T24N, R64E, Section 17 is located just west of the first well. A third well in T19N, R64E, Section 17 is located within the South Plant Site and may be the only well within the Duck Creek Flat allotment (Wilson 2007). Information about stock-watering facilities was collected from the Nevada State Engineer's Office website (NDWR 2006) and the BLM Ely District Office's GIS database. However, not all developed stock watering locations have State Engineer records, nor are they all mapped or recorded in BLM records. Therefore, the following list is potentially not complete. The information in **Table 3.9-5** is the most complete list of water wells, springs, and stock-watering tanks available at this time.

TABLE 3.9-5. WELLS, SPRINGS, AND STOCK WATERING FACILITIES LOCATED WITHIN OR ADJACENT TO THE NORTH AND SOUTH PLANT SITES

EEC ELEMENT	ALLOTMENTS	HMA	TOWNSHIP & RANGE	SECTION	LOCATION	OWNER-TYPE	ESTIMATED DISTANCE TO EEC ELEMENT
North Plant Site	Cherry Creek	Antelope	T24N R64E	16	SE ¼ SW ¼	Private - well	0.25 mi. W
				17	SE ¼ SE ¼	BLM - well	1 mi. W
South Plant Site	Steptoe and Duck Creek Flat	None	T19N, R64E	17	SE ¼ SE ¼	Private - well	0 mi.

3.9.4.2 Electric Transmission Facilities

Grazing Allotments

Up to 39 grazing allotments would be crossed by one or more elements of the proposed electric transmission facilities. **Table 3.9-6** lists these facilities by transmission line segment, the allotments, and the allotment acres that these facilities would potentially intersect if chosen. Not all proposed segments of the electric transmission facilities would be developed, thus not all the allotments noted below would be affected. All allotments within the direct and indirect effects area in the Southern Nevada District have been relinquished. That is, there is no active grazing by livestock within these allotments, thus the AUMs are not used. Also note that some of the allotments are listed more than once.

TABLE 3.9-6. ALLOTMENTS INTERSECTED BY ELECTRIC TRANSMISSION FACILITIES

ELECTRIC TRANSMISSION ELEMENT	ALLOTMENT	TOTAL ACRES IN ALLOTMENT	AUMS IN ALLOTMENT*
1) South Plant Site to Robinson Summit Substation: Interconnect from plant to Segments 4A and 1D	Steptoe	58,121	4,525
	Medicine Butte	311,263	15,174
	South Butte	27,830	508
	Butte Seeding	1,511	350
	Thirty Mile Spring	188,872	8,405
2) Robinson Summit Substation (Segments 1E and 6A)	Thirty Mile Spring	188,872	8,405
3) Interconnect from South Plant Site to Falcon-Gondor Line (Segment 3)	Steptoe	58,121	4,525
	Heusser Mt	36,620	1,416
	Goat Ranch	6,075	213

ELECTRIC TRANSMISSION ELEMENT	ALLOTMENT	TOTAL ACRES IN ALLOTMENT	AUMS IN ALLOTMENT*
4) Robinson Summit to Harry Allen Substation, Segments 6C, 8, 9B, 9A, 9D, 11	Thirty Mile Spring	188,872	8,405
	Badger Springs	33,755	1,412
	Indian Jake	48,894	2,948
	Giroux Wash	58,017	3,107
	Tom Plain	81,080	4,439
	McQueen Flat	11,694	496
	Douglas Canyon	15,043	175
	Douglas Point	13,889	368
	North Cove	27,296	879
	Cove	28,273	3,967
	Wells Station	13,925	302
	Hardy Springs	125,651	3,478
	Forest Moon	117,532	2,263
	Sunnyside	237,408	5,402
	Fox Mountain	73,430	6,322
	Wilson Creek	1,071,661	54,070
	Simpson	8,088	747
	Ely Springs Sheep	24,238	4,248
	Ely Springs	57,850	4,248
	Cliff Springs	37,019	2,043
	Oak Springs	197,950	9,268
	Buckhorn	80,664	3,370
	Lower Lake East	52,550	640
	Arrow Canyon	114,987	0
	Pitman Well	43,210	0
	Dry Lake	35,414	0
5) Harry Allen Substation	Dry Lake	35,414	0
6) Other Transmission Line Components (Fiber Optic Regeneration Sites and Electric Power Service, Material and Construction Yards, etc.)	Includes all allotments listed in 1, 2, 3, and 4	3,385,987	147,311
7a) North Plant Site from plant site to Harry Allen Substation, no Robinson Summit Substation: Segments 1B, 1C, and 9C	Cherry Creek	173,206	7,040
	Middle Steptoe	3,697	173
	Duck Creek Flat	37,337	1,321
	Gold Canyon	23,674	1,068
	Steptoe	58,121	4,525
	Plus 4 above	2,609,518	108,098
7b) North Plant Site from plant site to Harry Allen Substation, Alternative route: Segment 1A	Cherry Creek	173,206	7,040
	North Steptoe	15,606	700
	Middle Steptoe	3,697	173
	Gold Canyon	23,674	1,068
	Steptoe	58,121	4,525
	Plus 4 above	2,609,518	108,098
8) Alt. Segment 10 over Delamar Mts.	Buckhorn	82,968	3,370
	Delamar	203,000	5,558
	Grapevine	22,000	560

*AUM Data from Wilson (2007).

HMAs

The Antelope, Butte, Jakes Wash, White River, Seaman, Dry Lake, Highland Peak, and Delamar Mountains HMAs are within the direct and indirect affects area of the electric transmission facilities (**Figure 3.9-2**).

There are no wild burros in the project area.

Not every proposed segment of electric transmission facilities would be developed so it is possible that not all the HMAs noted above would be affected. **Table 3.9-7** below lists which segments of the electric transmission facilities would intersect each HMAs. These HMAs are described in more detail after the table.

TABLE 3.9-7. HMAS INTERSECTED BY ELECTRIC TRANSMISSION FACILITIES

ELECTRIC TRANSMISSION ELEMENT	HORSE MANAGEMENT AREA	TOTAL ACRES IN HMA	AML*	POPULATION ESTIMATE^
1) South Plant Site to Robinson Summit Substation: Segments 4A, 1D	Butte	444,020	95	95
2) Robinson Summit Substation (Segments 1E and 6A)	None	None	None	None
3) Interconnect from South Plant Site to Falcon-Gondor Line (Segment 3)	None	None	None	None
4a) Robinson Summit to Harry Allen Substation, Segments 6C, 8, 9B, 9A, 9D, 11	Jakes Wash	153,661	1-21	70
	White River	117,348	90	95
	Seaman	361,249	159	175
	Dry Lake	494,318	94	95
	Highland Peak	137,871	20-33	35
	Delamar Mountains	186,131	51-85	45
4b) Temporary Access roads, Fiber Optics access along entire length	Same areas as 4a above			
5) Harry Allen Substation	None	None	None	None
6) Power Line Segment 3 from South Steptoe Site Interconnect to Gondor Substation if White Pine not constructed	None	None	None	None
7) North Steptoe Site to Harry Allen Substation, no Robinson Summit Substation: 1, 1A, 9C	Antelope	400,333	324	280
	Same as 1a, 1b and 4a, 4b above			
8) Alt. Segment 10 over Delamar Mts.	Delamar Mountains	186,131	51-85	45

*AML = Appropriate Management Level

^ Data are from Ely District Wild Horse Herd Management Areas, March 1, 2007 Population Estimate, received via email from BLM Ely office June 2007.

Antelope HMA

The Antelope HMA is described in **Section 3.9.4.1** above. Segments 1B and 1A would pass through this HMA if the North Plant Site were developed.

Butte HMA

Segment 1D would pass through the southeastern corner of the Butte HMA just north of the Robinson Summit Substation. This is the only EEC element that would pass through this HMA.

This HMA encompasses the Egan Range west of McGill and extends across Butte Valley to the east side of the Butte Mountains. The Butte HMA encompasses approximately 444,020 acres (695 square miles), 98 percent of which are public lands (Noyes 2007).

The Butte HMA has an appropriate management level and estimated actual horse population of 95 wild horses (Noyes 2007). The wild horses tend to gather in the higher elevations in summer and lower elevations in winter and are rarely observed in the southern section of the Butte HMA (BLM 2007e).

Jakes Wash

Segment 6C would run through the eastern half of Jakes Wash HMA. This is the only project element that would affect this HMA.

This HMA covers the southern half of the Egan Range south of US-6 and extends eastward to the White River Valley. The southeastern boundary is US-6 and the western boundary roughly follows the west side of Jakes Valley. Its northern extent is located just south of the Robinson Summit Substation and is approximately 11 miles west of Ely and 17 miles west-southwest of McGill. It is 153,661 acres in size (240 square miles) and is all public land.

The Jakes Wash HMA has 70 horses and no burros utilizing the land, although the appropriate management level for this HMA is only 1 to 21 horses (Noyes 2007).

White River

Segment 6C would run through the eastern half of the White River HMA. This HMA is located approximately 17 miles south of Jakes Wash HMA. This small HMA covers the eastern half of the Grant Range and the outwash slopes below these mountains. The Blue Eagle Wilderness study area is located in the western third of this HMA. There are 117,348 acres in this HMA, all of which are managed by the BLM. Access is via remote dirt roads leading from US-6 or SR-318.

The White River HMA is managed for 90 horses although there are currently an estimated 95 horses using the HMA (Noyes 2007).

Seaman

Segment 6C would pass through approximately 12 miles of the Seaman HMA. This HMA is located approximately 5 miles south of the White River HMA. It encompasses the Seaman Range, Coal Valley, and Golden Gate Ranges. Its northeastern border is partially shared with the Kirch WMA. Its southeastern border is delineated by SR-318. The Weepah Spring Wilderness Area is located in the southeastern quarter of the HMA. There are 361,249 acres (564 square miles) in this HMA, 99.5 percent of which are managed by BLM.

This HMA is managed for 159 horses and no burros, although there are currently an estimated 175 horses using the HMA (Noyes 2007).

Dry Lake

Segment 6C would enter the Dry Lake HMA from the west, crosses the southern third of the Schell Creek Range, then Segment 8 turns south to run along the Dry Lake Valley through the center of this HMA.

The east boundary of the Dry Lake HMA is US-93 and the west boundary is defined by SR-318 and the east edge of the South Egan Range. It includes most of Cave Valley and Muleshoe Valley on the north. It cuts across the North Pahroc, Dry Lake Valley, and Highland Range on

the south. It is 494,318 acres in size (772 square miles) and is 99.5 percent public land. The communities of Pioche and Casselton are located at the southeast corner of the HMA.

This HMA is managed for 94 horses, and there are currently an estimated 95 horses using the HMA (Noyes 2007).

Highland Peak

Segment 8 would just touch the northwest edge of this HMA. Only about 2 linear miles of the HMA would be in the direct affects area.

Highland Peak's north border abuts Dry Lake's southeastern border. The Highland Range and Chief Range are within the HMA. The towns of Pioche and Casselton are to the east, which are serviced by US-93. SR-320, looping west of Pioche, defines the northeastern boundary and US-93 wraps around the east and south sides of the HMA. The HMA is 137,871 acres in size (215 square miles), 98.7 percent of which is managed by the BLM.

This HMA currently has approximately 35 horses on it, while the management goal is 20-33 horses (Noyes 2007).

Delamar Mountains

Segment 8 would traverse the west boundary of the Delamar Mountains HMA and thus, would not be technically within the HMA. Segment 10 would cross through the southwestern limb of the HMA and the Delamar Mountains for about 10 miles in an area about 5 miles north of the Delamar Mountains Wilderness Area.

This HMA encompasses the central portion of the Delamar Mountains. It is bounded on the east by the Applewhite and Clover Mountains HMAs and SR-317. It is bounded on the west by an existing power line maintenance road and other two-track roads in the Delamar Valley. The southern border runs north of Boulder Canyon, crosses Spring Valley, and includes the very northern portion of the Meadow Valley Range. It is 186,131 acres in size (291 square miles), 99.2 percent of which is managed by the BLM.

The current estimated population is 45 horses and 0 burros. The preferred management level is 51-85 horses (Noyes 2007).

Vegetation and Forage Production

Typical vegetation and forage production rates for ecological sites from selected locations along the electric transmission facilities range from 2,200 pounds total vegetation and 1,650 pound forage per acre in a good year on a Saline Bottom Ecological Site (028BY004NV) dominated by Basin wildrye and alkali sacaton to 75 pounds total vegetation and 4 pounds forage per acre in a poor year on a Limy 3-5 P.z. Ecological Site (R030XB019NV). Note that the latter site is near the south end of the electric transmission line where temperatures are higher, vegetation communities are more "brittle", and the referenced site is dominated by annual plants. Vegetation and forage production rates for good, fair, and poor years for selected ecological sites located in or near the electric transmission facility segments are listed in **Table 3.9-8**.

A few range improvements have been completed along the electric transmission facilities. These include seedings along Segment 3 in the Goat Range Allotment and in the Huesser Mt. Allotment, and seedings along Segment 6C in the McQueen Flat and Douglas Canyon Allotments.

TABLE 3.9-8. VEGETATION AND FORAGE PRODUCTION RATES FOR SELECTED AREAS WITHIN THE ELECTRIC TRANSMISSION FACILITIES ELEMENTS

ECOLOGICAL SITE/SOIL SERIES	TOTAL ANNUAL AIR-DRY PRODUCTION (LBS/ACRE): VEGETATION / FORAGE			DOMINANT SPECIES AND THEIR PERCENT COVER
	GOOD YEAR	FAIR YEAR	POOR YEAR	
SEGMENT 1A				
Soil Map Unit Number/Name: 421 – Wintermute gravelly sandy loam, 0% to 4% slopes, 1248.3 acres				
Coarse Gravelly Loam 6-8 P.z. (028BY075NV) Wintermute	700/364	500/260	300/156	Indian ricegrass 40% Shadscale 25% Winterfat 5%
SEGMENT 1B				
Soil Map Unit Number/Name: 491 – Kunzler-Katelana association: 2096.2 acres				
Sodic Terrace 8-10 P.z. (028BY028NV) Kunzler	800/200	600/150	400/100	Black greasewood 35% Big sagebrush 20% Basin wildrye 15%
SEGMENT 1C				
Soil Map Unit Number/Name: 361 – Belmill-Cowgil-Selti association, 1436.3 acres				
Loamy 8-10 P.z. (028BY010NV) Cowgil	800/360	600/270	400/45	Wyoming big sagebrush 25% Indian ricegrass 20% Needleandthread 10%
SEGMENT 1C				
Soil Map Unit Number/Name: 1251 – Alley-Yody-Cowgil association, 1666.3 acres				
Gravelly clay 10-12 P.z. (028BY086NV) Yody	700/364	650/293	350/158	See Belmil above
SEGMENT 3				
Soil Map Unit Number/Name: 810 – Yody-Fax association, 1201.0 acres				
Loamy 10-12 P.z. (028BY007NV) Fax	1,000/600	800480	600360	See Selti, above
SEGMENT 4A				
Soil Map Unit Number/Name: 1132 – Duffer silt loam, 0 to 2% slopes, 736.6 acres				
Saline Bottom (028BY004NV) Duffer	2,200/1,650	1.500/1,125	800/600	Basin wildrye 45% Alkali sacaton 15% Western wheatgrass 5%
SEGMENT 6C				
Soil Map Unit Number/Name: 124 – Tecomar-Pookaloo association, 1476.0 acres				
Shallow Calcareous Hill 14+ P.z. (028BY090NV) Tecomar	400/140	250/88	125/44	Black sagebrush 35% Bluebunch wheatgrass 20% Scribner needlegrass 5% Stansbury cliffrose 5%
SEGMENT 8				
Soil Map Unit Number/Name: 1510 - Raph-Zimwala-Heist association, 1108.9 acres				
Shallow Silty 8-10 P.z. (028BY009NV) Raph	500/200	400160	300120	Shadscale 45% Indian ricegrass 25% Bottlebrush squirreltail 10%
SEGMENT 9B				
Soil Map Unit Number/Name: 1520 – Fax-Yody-Broland association, 1096.4 acres				
Shallow Clay Loam 10-12 P.z. (028BY089NV) Broland	450/248	300/193	150/83	Indian ricegrass 25% Black sagebrush 25% Thurber's needlegrass 20%

ECOLOGICAL SITE/SOIL SERIES	TOTAL ANNUAL AIR-DRY PRODUCTION (LBS/ACRE): VEGETATION / FORAGE			DOMINANT SPECIES AND THEIR PERCENT COVER
	GOOD YEAR	FAIR YEAR	POOR YEAR	
SEGMENT 9D				
Soil Map Unit Number/Name: AB – Arizo-Bluepoint association, 622.0 acres				
Limy 3-5 P.z. (R030XB019NV) Arizo	200/10	125/6	75/4	White bursage 65% Creosote bush 10% Range ratany 5%
SEGMENT 10				
Soil Map Unit Number/Name: 1520 – Fax-Yody-Broland association, 174.6 acres				
See Segment 9B above				
SEGMENT 11				
Soil Map Unit Number/Name: CTC – Colorock-Tonopah association, 7567.8 acres				
Limy 5-7 P.z. (R030XB005NV) Tonopah	325/81	240/60	90/23	Miscellaneous shrubs 17% Miscellaneous annual forbs 15% Big galleta 10% Miscellaneous annual grasses 5%

Source: NRCS Undated. From NRCS soil surveys, accessed at: http://websoilsurvey.nrcs.usda.gov/app/. Includes data from soil surveys for Lincoln County, Nevada, South Part; Nye County, Nevada Northeast Part; Western White Pine County Area Nevada, Parts of White Pine and Eureka Counties; Virgin River Area, Nevada and Arizona, and Elko County, Nevada, Southeast Part; All surveys are from Web Soil Survey 2.0 Accessed July 17 and August 9, 2007, and January 2008.

Water Wells

There are several wells, springs, and stock-watering facilities located along the proposed electric transmission facilities corridors. Information about these facilities was collected from the Nevada State Engineer website (NDWR 2006), field surveys for this EIS, and the BLM Ely, Elko, and Southern Nevada District offices. However, not all developed stock watering locations have State Engineer records, nor have they all been mapped or recorded in BLM records. The information in **Table 3.9-9** is the most complete list of water wells, springs, and stock watering tanks available at this time.

TABLE 3.9-9. WELLS, SPRINGS, AND STOCK WATERING FACILITIES LOCATED WITHIN 1.5 MILES OF THE ELECTRIC TRANSMISSION FACILITIES

EEC ELEMENT	ALLOTMENT	HMA	TOWNSHIP & RANGE	SECTION	LOCATION	OWNER – TYPE	DISTANCE TO EEC ELEMENT
Seg. 1B	Cherry Creek	Antelope Valley	24N, 64E	16	SW ¼	Private - Well	1.25 mi. E*
	Cherry Creek	Antelope	23N, 63E	02	SW ¼	Private - Cherry Creek Hot Spring	1.0 mi. E
	Cherry Creek	None	22N, 63E	16	NE ¼	BLM - Borchert Spring	1.25 mi. W
Seg. 1C	Duck Creek Flat	None	21N, 64E	12	SE ¼	Private - Cold Spring	1.0 mi. E
	Duck Creek Flat	None	21N, 64E	24	SW ¼	Private - Monte Neva Spring	1.0 mi. E

EEC ELEMENT	ALLOTMENT	HMA	TOWNSHIP & RANGE	SECTION	LOCATION	OWNER – TYPE	DISTANCE TO EEC ELEMENT
Seg. 1C/1D	Heusser Mountain	None	20N, 63E	20	NW ¼	BLM - California Canyon Spring	1.0 mi. E
	Steptoe	Butte	20N, 63E	05	SE ¼	BLM - Billy Rope Spring	w/in corridor
	Steptoe	Butte	20N, 63E	08	NW ¼	BLM - Mud Spring	w/in corridor
Seg. 1D	Steptoe	Butte	20N, 62E	14	SW ¼	BLM - Dry Canyon Spring	1.25 mi E
	Thirty Mile Spring	None	19N, 61E	33	SW ¼	BLM - Cedar Spring	1.25 mi E
Seg 1D & Robinson Summit Substation area	Thirty Mile Spring	None	18N, 61E	19	NW ¼	BLM - Summit Spring	w/in corridor
Seg. 3	Goat Ranch	None	18N, 63E	14	SW ¼	BLM - Kid Spring	1.0 mi. W
	Goat Ranch	None	18N, 64E	23	SW ¼	BLM - Sheep Spring	1.0 mi. E
	Heusser Mountain	None	18N, 63E	21	SE ¼	BLM - Lusetti Spring	1.0 mi. E
	Goat Ranch	None	18N, 63E	26	SW ¼	BLM - Camp Spring	1.0 mi. E
	Goat Ranch	None	18N, 63E	34	SW ¼	BLM - Goat Spring	1.0 mi. E
Seg. 10	Grapevine	None	10S, 64E	9	NW ¼	Unknown - Reservoir	1.5 mi.

*1.25 mi. E = 1.25 miles East of project component

3.9.4.3 Water Supply Facilities

Numerous water supply facility alternatives have been developed for the North and South Plant Sites, which are described in Chapter 2. All occur within Steptoe Valley, with the exception of the Duck Creek pipeline alternative that occurs partially in Duck Creek Valley. Current grazing allotments and HMAs that would fall within the area proposed for the water supply facilities are discussed below.

Grazing Allotments

Table 3.9-10 lists the various water facilities alternatives and the allotments, allotment acres, and the number of AUMS per allotment that the water facilities could potentially intersect. Note that some of the allotments are noted more than once.

TABLE 3.9-10. ALLOTMENTS INTERSECTED BY WATER SUPPLY FACILITIES

PROJECT ELEMENT	ALLOTMENT	ACRES IN ALLOTMENT	AUMS IN ALLOTMENT*
Water Supply Lines from Lages Station to North Plant Site	Becky Springs	46,362	3,842
	Cherry Creek	173,205	7,040
Water Supply Lines between North Plant Site & South Plant Site	North Steptoe	15,606	700
	Schellbourne	17,985	799
	Middle Steptoe	3,697	173
	Duck Creek Flat	37,337	1,321
	Steptoe	58,121	4,525
Lages Station Well Field (only)	Private land – no allotments		
Coyote Valley Ranch Well Field (only)	Private land – no allotments		
Duck Creek Reservoir and Pipeline Alternative to South Plant Site	Gallagher Gap	3,900	169
	Schoolhouse Spring	6,656	4,525
	Duck Creek Basin	10,603	121
Middle Well Field Alternative (includes both the South and North Plant Site)	North Steptoe	15,606	700
	Schellbourne	17,985	799
	Middle Steptoe	3,697	173
	Duck Creek Flat	37,337	1,321
	Steptoe	58,121	4,525
	Cherry Creek	173,205	7,040
Limited South Well Field Alternative to South Plant Site	Becky Springs	46,362	3,842
	Cherry Creek	173,205	7,040
	North Steptoe	15,606	700
	Schellbourne	17,985	799
	Middle Steptoe	3,697	173
	Steptoe	58,121	4,525
	Duck Creek Flat	37,337	1,321
South Well Field Alternative to South Plant Site	Steptoe	58,121	4,525
	Duck Creek Flat	37,337	1,321

*AUM Data from Wilson 2007.

HMAs

The proposed water supply facilities would affect only the Antelope HMA in the Ely BLM District. This HMA is 400,333 acres in size and has a current population of 280 horses, with a target population of 324 (Noyes 2007). This HMA is described in more detail in **Section 3.9.4.1**.

Vegetation and Forage Production

Typical vegetation and forage production rates for ecological sites within and along the water pipeline and well field alignments on a good year may be 800 pounds total vegetation production, and 360 pounds forage production per acre on a Loamy 8-10" P.z. Ecological Site (028BY010NV). Vegetation is dominated by Wyoming big sagebrush, Indian ricegrass, and needleandthread. A Shallow Calcareous Slope Ecological Site 8-10" P.z. (028BY016NV) in a poor year may have only 100 pounds of total vegetation and 40 pounds of forage per acre in a bad year. Vegetation here is dominated by black sage, Indian ricegrass, and needleandthread grass. Vegetation production rates for good, fair, and poor years for selected ecological sites located in or near the water pipeline alignments are listed in **Table 3.9-11**.

TABLE 3.9-11. VEGETATION PRODUCTION FOR REPRESENTATIVE ECOLOGICAL SITES FOR THE WATER WELL AND PIPELINE FACILITIES

MAP UNIT NUMBER / MAP UNIT NAME	TOTAL ANNUAL AIR-DRY VEGETATION PRODUCTION (LBS/ACRE): VEGETATION / FORAGE			DOMINANT SPECIES AND THEIR PERCENT COVER
	GOOD YEAR	FAIR YEAR	POOR YEAR	
LAGES STATION WELL FIELD				
Soil Map Unit Number/Name: 1120 – Kunzler-Sycomat association, 2253.1 acres				
Sodic Terrace 8-10 P.z.* (028BY028NV) Kunzler	800/200	600/150	400/100	Black greasewood 35% Big sagebrush 20% Basin wildrye 15%
Sodic Terrace 5-8 P.z. (028BY074NV) Sycomat	600/90	400/60	200/30	Shadscale 40% Black greasewood 25% Bud sage 5%
Soil Map Unit Number/Name: 181 – Pyrat-Cowgil-Broyles association, 246.8 acres				
Loamy, 8-10 P.z. (028BY010NV) Pyrat	800/360	600/270	400/180	Wyoming big sagebrush 25% Indian ricegrass 20% Needleandthreadgrass 10%
Loamy, 8-10 P.z. (028BY010NV) Cowgil	800/360	600/270	400/180	Wyoming big sagebrush 25% Indian ricegrass 20% Needleandthreadgrass 10%
Coarse Gravelly Loam 6-8" P.z. (028BY075NV) Broyles	700364	500/225	300/156	Indian ricegrass 40% Shadscale 25% Winterfat 5%
DUCK CREEK WATER LINE				
Soil Map Unit Number/Name: 160 – Zerk-Heist-Tosser association, 129.8 acres				
Coarse Gravelly Loam Ecological Site, 6-8" P.z. (028BY075NV) Zerk (55% of map unit)	700/434	500/310	300/186	Indian ricegrass 40% Shadscale 25% Winterfat 5%
Coarse Silty Ecological Site, 6-8 P.z. (028BY084NV) Heist (15% of map unit)	900/675	700/525	400/300	Indian ricegrass 40% Winterfat 25% Budsage 5%

MAP UNIT NUMBER / MAP UNIT NAME	TOTAL ANNUAL AIR-DRY VEGETATION PRODUCTION (LBS/ACRE): VEGETATION / FORAGE			DOMINANT SPECIES AND THEIR PERCENT COVER
	GOOD YEAR	FAIR YEAR	POOR YEAR	
Shallow Calcareous Slope Ecological Site, 8-10 P.z.(028BY016NV) Tosser (15% of map unit)	350/140	225/90	100/40	Black Sagebrush 40% Indian ricegrass 15% Needleandthread 10%
SOUTH PLANT SITE WATER SUPPLY LINE				
Soil Map Unit Number/Name: 421 – Wintermute gravelly sandy loam, 0% to 4% slopes,727.3 acres				
Coarse Gravelly Loam 6-8 P.z. (028BY075NV) Wintermute	700/364	500/260	300/156	Indian ricegrass 40% Shadscale 25% Winterfat 5%
NORTH PLANT SITE WATER SUPPLY LINE				
Soil Map Unit Number/Name: 1120 - Kunzler-Sycomat association, 391.4 acres				
See Lages Station Well Field, above				

Source: NRCS soil surveys, accessed at:http://websoilsurvey.nrcs.usda.gov/app/. Includes data from soil surveys for Lincoln County, Nevada, South Part; Nye County, Nevada Northeast Part; Western White Pine County Area Nevada, Parts of White Pine and Eureka Counties; and Elko County, Nevada, Southeast Part; All surveys are from Web Soil Survey 2.0 Accessed July 17 and August 9, 2007.
*P.z. = precipitation zone

Water Wells
There are no known stock-watering facilities located within the proposed water supply facilities routes. Verification of this information was collected from the Nevada State Engineer Office website (NDWR 2006) and field surveys conducted for this EIS and the BLM Ely District Office. However, not all developed stock watering locations have State Engineer records, nor are they all mapped or recorded in BLM records, but this is the best available information.

3.9.4.4 Rail Facilities

Using the existing Nevada Northern Railway (NNRy) as part of the Proposed Action, would require a rail lead from the NNRy to the plant site. There are two potential rail leads included in the analysis.

In the event that the NNRy is not available for use, an Alternative Rail Line is proposed. The Alternative Rail Line would be constructed from Shafter, approximately 6 miles south of I-80, and would run southward to the selected plant site. It would be located east of the existing NNRy, which also begins at Shafter and runs southward to the towns of Ely and Ruth.

Regardless of the rail transport option chosen, the proponents do not plan to fence any part of the railroad ROW. Cattle and horses would have access along and across the railroad ROW in the grazing allotments and HMAs that surround the chosen rail line. This means that cattle and/or horses would be free to cross the rail line to access water sources.

The allotments and HMAs that could have rail facilities pass through them are discussed below.

Grazing Allotments
Table 3.9-12 lists the allotments, allotment acres, and the number of AUMs per allotment that the proposed Alternative Rail Line and the rail leads to the plant sites would pass through.

TABLE 3.9-12. ALLOTMENTS INTERSECTED BY RAIL FACILITIES

PROJECT ELEMENT	ALLOTMENT	TOTAL ACRES IN ALLOTMENT*	AUMS IN ALLOTMENT*
Alternative Rail Line	Big Springs	492,887	12,175
	Spruce	723,826	10,965
	Valley Mountain	92,116	5,572
	Currie	157,884	5,504
	Becky Spring	46,362	3,842
	Cherry Creek	173,206	7,040
	North Steptoe	15,606	700
	Schellbourne	17,985	799
	Middle Steptoe	3,697	173
	Duck Creek Flat	37,337	1,321
	Steptoe	58,121	4,525
	TOTAL	1,819,027	52,616
Rail Lead to South Plant Site	Steptoe	58,121	4,525
Rail Lead to North Plant Site	Cherry Creek	173,206	7,040

*AUM data from Ely and Elko District Offices.

HMAs

The Alternative Rail Line would pass through the Goshute, Antelope Valley, and Antelope HMAs. The rail lead for the North Plant Site would cross through the Antelope HMA and the rail lead for the South Plant Site would not cross through any HMA. The acreage and the estimated and target populations of these HMAs are described in **Table 3.9-13**.

TABLE 3.9-13. HMAS INTERSECTED BY THE RAIL FACILITIES

PROJECT ELEMENT	HORSE MANAGEMENT AREA	TOTAL ACRES IN HMA	AML	CURRENT POPULATION ESTIMATE
Alternative Rail Line and Rail Lead for the North Plant Site	Goshute	267,277	123	74
	Antelope Valley	502,914	259	159
	Antelope	400,333	324	280

Data are from Nevada Wild Horse and Burro Herd Area Statistics - FY 2005, located at http://www.wildhorseandburro.blm.gov/statistics/2005/index.htm, and from "Ely District Wild Horse Herd Management Areas, March 1, 2007 Population Estimate", received via email from BLM Ely office June, 2007

Antelope Valley HMA

The Alternative Rail Line would pass through approximately 24 miles of the Antelope Valley HMA, located in the Elko BLM District.

This HMA sits just north of the border between Elko and White Pine Counties. Its western boundary follows the ridgeline of the Cherry Creek Range northward to the small community of Currie, and then follows the existing railroad line further north into the Goshute Valley, then

swings eastward around the north end of the Antelope Range to the Utah border. Access is via US-93 and Alternate US-93. The Antelope Valley HMA spans 502,914 acres (786 square miles), almost 99 percent of which are public lands.

The Antelope Valley HMA has an appropriate management level of 259 wild horses. Current population is 159 horses (Noyes 2007).

Goshute Valley HMA

Approximately 8 miles of the Alternative Rail Line would pass through the very west edge of the Elko BLM's Goshute HMA.

The Goshute HMA surrounds the Bluebell and Goshute Creek WSAs at the north end of the project area in Elko County. The eastern edge of the HMA is bounded by the Great Salt Lake Desert, and the western boundary is the Goshute Valley. This HMA is accessible from US-93 on the east and south, and is close to Wendover, NV. It is roughly 70 miles north of McGill as the crow flies. The Goshute HMA is 267,277 acres in size (474 square miles), 95.7 percent of which is BLM land.

The Goshute HMA currently has an estimated 74 horses, with a target population of 123 horses (Noyes 2007).

Antelope HMA:

The Alternative Rail Line and the rail lead to the North Plant Site would pass through the Antelope HMA. The existing but currently non-operational NNRy railroad alignment creates the west boundary of this HMA. The Antelope HMA has been described in more detail in **Section 3.9.4.1**.

Vegetation and Forage Production

Typical vegetation and forage production rates for ecological sites along the Alternative Rail Line ranges from 1,500 pounds per acre total vegetation production, and 1,275 pounds forage production on a Saline Meadow Ecological Site (028BY001NV) in a good year, where vegetation is dominated by alkali sacaton, alkali cord grass, sedges, and rushes; to 100 pounds per acre total vegetation production, and 40 pounds forage production on a Shallow Calcareous Slope, 8-10 P.z. Ecological Site (028BY016NV) in a bad year, where vegetation is dominated by black sagebrush, Indian ricegrass and needleandthread. Vegetation and forage production rates for good, fair, and poor years for selected ecological sites located within the Alternative Rail Line ROW are listed in **Table 3.9-14**.

TABLE 3.9-14. VEGETATION AND FORAGE PRODUCTION WITHIN THE RAIL FACILITIES

MAP UNIT NUMBER / MAP UNIT NAME	TOTAL ANNUAL AIR-DRY VEGETATION PRODUCTION (LBS/ACRE): VEGETATION / FORAGE			DOMINANT VEGETATION AND PERCENT COVER
	GOOD YEAR	FAIR YEAR	POOR YEAR	
South Plant Site Rail Lead				
160 – Zerk-Heist-Tosser association, 97.8 acres				
Coarse Gravelly Loam Ecological Site, 6-8 P.z.* (028BY075NV) Zerk (55% of map unit)	700/434	500/310	300/186	Indian ricegrass 40%, Shadscale 25% Winterfat 5%
Coarse Silty Ecological Site, 6-8 P.z. (028BY084NV) Heist (15% of map unit)	900/675	700/525	400/300	Indian ricegrass 40% Winterfat 25% Budsage 5%
Shallow Calcareous Slope, 8-10 P.z. (028BY016NV) Tosser (15% of map unit)	350/140	225/90	100/40	Black sagebrush 40% Indian ricegrass 15% Needleandthread 10%
421 – Wintermute gravelly sandy loam, 0% to 4% slopes, 38.1 acres				
Coarse Gravelly Loam 6-8 P.z. (028BY075NV) Wintermute (90% of soils)	700/364	500/260	300/156	Indian ricegrass 40% Shadscale 25% Winterfat 5% Other shrubs 13% Other perennial grasses 7% Forbs 5%
Alternative Rail Line (between South and North plant sites)				
160 – Zerk-Heist-Tosser association, 94.2 acres				
See South Steptoe Plant Site Rail Lead, above	See above			See above
North Plant Site Rail Lead				
1130 – Duffer-Equis association, 115.3 acres				
Saline Meadow (020BY001NV) Duffer	1,500/1,275	1,000/850	700/595	Alkali sacaton 45% Alkali cordgrass 10% Sedge 5% Baltic rush 5% Other perennial grasses 20% Perennial forbs 5% Shrubs 5%
Saline Bottom (028BY004NV) Duffer	2,200/1,650	1.500/1,125	800/600	Basin wildrye 45% Alkali sacaton 15% Western wheatgrass 5% Other perennial grasses 10 % Perennial forbs 5% Shrubs 15%
Saline Meadow (020BY001NV) Equis	1,500/1,275	1,000/850	700/595	Alkali sacaton 45% Alkali cordgrass 10% Sedge 5% Baltic rush 5% Other perennial grasses 20% Perennial forbs 5% Shrubs 5%

MAP UNIT NUMBER / MAP UNIT NAME	TOTAL ANNUAL AIR-DRY VEGETATION PRODUCTION (LBS/ACRE): VEGETATION / FORAGE			DOMINANT VEGETATION AND PERCENT COVER
	GOOD YEAR	FAIR YEAR	POOR YEAR	
1270 – Boofus-Equis association, 102.3 acres				
Sodic Flat 8-10 P.z. (028BY069NV) Boofus	800/224	600/168	400/112	Black greasewood 55% Basin wildrye 15% Inland saltgrass 5% Other perennial grasses 8% Other shrubs 5% Perennial Forbs 7%
Sodic Flat 5-8 P.z. (028BY020NV) Boofus	500/85	300/51	150/26	Black greasewood 60% Shadscale 5% Rubber rabbitbrush 5% Other shrubs 5% Perennial grasses 17% Perennial forbs 3%
Saline Meadow (020BY001NV) Equis	1,500/1,275	1,000/850	700/595	Alkali sacaton 45% Alkali cordgrass 10% Sedge 5% Baltic rush 5% Other perennial grasses 20% Perennial forbs 5% Shrubs 5%
Alternative Rail Line (north of North Plant Site)				
1190 – Katelana-Boofus association, 288.0 acres				
Sodic Terrace 5-8 P.z. (028BY074NV) Katelana	600/90	400/60	200/30	Shadscale 40% Black greasewood 25% Bud sage 5% Other shrubs 5% Perennial grasses 15% Perennial forbs 5%
Sodic Flat 5-8 P.z. (028BY020NV) Boofus	500/85	300/51	150/26	Black greasewood 60% Inland saltgrass 5% Other shrubs 15% Perennial grasses 12% Perennial forbs 3%
1120 - Kunzler-Sycomat association, 286.0 acres				
Sodic Terrace 8-10 P.z. (028BY069NV) Kunzler (55% of soils in assoc.)	800/200	600/150	400/100	Black greasewood 35% Big sagebrush 20% Basin wildrye 15%
Sodic Terrace 5-8 P.z. (028BY074NV) Sycomat (30% of soils in assoc.)	600/90	400/60	200/30	Shadscale 40% Black greasewood 25% Bud sage 5%

Source: NRCS Undated. From NRCS soil surveys, accessed at: http://websoilsurvey.nrcs.usda.gov/app/. Includes data from soil surveys for Lincoln County, Nevada, South Part; Nye County, Nevada Northeast Part; Western White Pine County Area Nevada, Parts of White Pine and Eureka Counties; and Elko County, Nevada, Southeast Part; All surveys are from Web Soil Survey 2.0 Accessed July 17 and August 9, 2007.
*P.z. = Precipitation Zone
* High productivity associated with proximity to streams and wetlands.

Water Wells

There are several wells, springs, and other stock-watering facilities located along the Alternative Rail Line. Information about these facilities was collected from the Nevada State Engineer Office website (NDWR 2006), field surveys conducted for this EIS, and the BLM Ely and Elko District

Offices. **Table 3.9-15** lists the water wells, springs, and stock watering tanks that are within 1.5 miles of the rail facilities corridor.

TABLE 3.9-15. WELLS, SPRINGS, AND STOCK WATERING FACILITIES LOCATED WITHIN 1.5 MILES OF THE RAIL FACILITIES

ALLOTMENT	HMA	TOWNSHIP & RANGE	SECTION	LOCATION	OWNER - TYPE	ESTIMATED DISTANCE TO EEC ELEMENT (MILES)
Spruce	None	32N, 67E	19	SW ¼	Private – Well, Goshute Valley	1.25 from Alternative Rail Line
Spruce	None	30N, 66E	1	NE ¼	Private – Well, Goshute	1.0 from Alternative Rail Line
Spruce	Antelope Valley	30N, 66E	28	SW ¼	Private – Well, Mizpah	0.75 from Alternative Rail Line
Spruce	Antelope Valley	30N, 65E	24	SE ¼	Private – Well, Old Mizpah	0.75 from Alternative Rail Line
Currie	Antelope Valley	28N, 64E	36	NE ¼	Private – Red Tank Well	0.1 from Alternative Rail Line
Currie	Antelope Valley	28N, 64E	13	NE ¼	Private – Well, Mustang	0.5 from Alternative Rail Line
Currie	Antelope Valley	28N, 64E	13	NE ¼	Private – Well, Mustang	0.5 from Alternative Rail Line

3.10 Cultural Resources

Cultural resources are non-renewable resources. The National Historic Preservation Act (NHPA) of 1966, as amended, and the Archaeological Resources Protection Act of 1979 (ARPA) are the primary laws regulating preservation of cultural resources. Federal regulations obligate federal agencies to protect and manage cultural resource properties and prohibit the destruction of significant cultural sites (historic properties) without first mitigating the “adverse effect” to the site.

The NHPA sets forth procedures for considering effects to historic properties and supports and encourages the preservation of prehistoric and historic resources. It directs federal agencies to consider the impacts of their actions on historic properties. The NHPA established the Advisory Council on Historic Preservation (ACHP) and tasked the ACHP with administering and participating in the preservation review process established by Section 106. Section 106 of the NHPA, as amended, requires federal agencies to take into account any action that may adversely affect any structure or object that is, or can be, included in the NRHP. These regulations, codified at 36 CFR 800, provide criteria to determine if a site is eligible. Beyond that, the regulations define how those properties or sites are to be dealt with by federal agencies or other involved parties. These regulations apply to all federal undertakings and all cultural (archaeological, cultural, and historic) resources.

The ARPA set a broad policy that archaeological resources are important to the nation, as well as locally and regionally, and should be protected. The purpose of this Act was to secure the protection of archaeological resources and sites that are on public lands and Native American lands as well as promote increased cooperation and exchange of information among federal and state agencies, the professional archaeological community, and private individuals regarding archaeological resources. The law applies to any agency that receives information that a direct or federally assisted activity could cause irreparable harm to prehistoric, historic, or archaeological data and provides criminal penalties for prohibited activities. ARPA requires special permits prior to the excavation or removal of archaeological resources from public or Native American lands.

Cultural resources are defined as any definite location of past human activity identifiable through field survey, historical documentation, and/or oral evidence. Cultural resources have many values and provide data regarding past technologies, settlement patterns, subsistence strategies, and many other aspects of history. The guidelines for evaluation of significance and procedures for nominating cultural resources to the National Register of Historic Places (NRHP) can be found in 36 CFR 60.4. In order to be eligible for nomination to the NRHP, a cultural resource site/historic property must retain cultural integrity and meet at least one of the four National Register Criteria:

- Association with events that have made a significant contribution to the broad patterns of our history, or
- Association with the lives of persons significant to our past, or
- Embody the distinctive characteristics of a type, period, or method of construction; or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or
- Have yielded, or may be likely to yield, information important in prehistory or history.

A Traditional Cultural Property (TCP), as defined in the NHPA, is a property that is eligible for inclusion on the NRHP "because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (Parker and King 1994)." Stated another way, a significant TCP is defined as a property with "significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices (Parker and King 1994)."

3.10.1 Area of Analysis

A Programmatic Agreement establishing an Area of Potential Effect (APE) for cultural resources and outlining the methods of identification and treatment of cultural resources was completed for the EEC project and signed by the agencies. Under the Programmatic Agreement, the BLM has assumed responsibility for completing Section 106 compliance for cultural resoures within the APE. The APE for assessment of direct effects includes all of the EEC components associated with the Proposed Action and Action Alternatives as described in **Chapter 2**. The NNRy has been determined to be a federal undertaking and the Progammatic Agreement identifies it as part of the EEC APE.

Class III cultural resource inventories (systematic and detailed field inspections) were conducted within much of the footprint of areas potentially disturbed by the project. The project-specific

cultural resource inventories were initially divided up into three study units due to the size and complexity of the project components. Study Unit A encompassed the proposed plant sites, the Alternative Rail Line, the Robinson Station Substation, and areas involving the Lages Station and Duck Creek water supply alternatives (Seymour et al. 2007a). Study Unit B included the transmission lines and other water facilities (Duke et al. 2007). Study Unit C included alternative transmission corridors (i.e., Segment 9A, Segment 10) outside the SWIP Corridor and the Harry Allen Substation (Young et al. 2007). The portions of the SWIP Corridor proposed for the transmission lines were subjected to a Class I level of analysis (documentary research and study of existing cultural resource data) within Study Unit C.

Due to changes in project components as part of the early planning process, some components of the Project were not completely inventoried or not inventoried at all. However, for those areas not inventoried, comparable adjacent surveys exist and were used as the keystone studies described in **Section 3.10.3.4**. Archaeological sensitivity modeling was conducted for prehistoric and historic resources within all components of the EEC project, including the SWIP Corridor (Carpenter et al. 2008), making use of the project-specific and comparable adjacent surveys. The archaeological sensitivity modeling utilizes existing NRHP-eligible site data, and provides levels of archaeological sensitivity through acreages of NRHP-eligible site area rather than number of NRHP-eligible sites. Further, potential indirect effects of the EEC project components on historic architectural and linear resources, and the historic landscape, were analyzed in the Steptoe Valley watershed planning area (JRP 2007). The area of analysis for this historic resources study was determined by the Ely BLM in consultation with the Nevada State Historic Preservation Office.

3.10.2 Data Sources and Methods

Information regarding cultural resources in the project area was collected through literature searches and field inventory. Data for cultural resources includes record search information for an area 1-mile out from project components and field inventories of project components where comparable data does not exist, and results and/or extrapolation from previous applicable inventories (i.e., SWIP inventory and NNRy inventory).

3.10.3 Existing Conditions

3.10.3.1 Prehistory

The project area is located primarily within the Great Basin and partially within the Mojave Desert regions. The transmission corridor components of the EEC Project straddle two distinct areas—the Great Basin and eastern Mojave Desert. Boundary and transitional areas (peripheries) can be difficult to characterize. The period divisions for the Great Basin and the eastern Mojave regions are generally congruent. It appears that adaptive/technological/cultural changes occurred in the same general time frames for both regions; this is likely even more true in transitional or boundary regions. Therefore, a simplified four-phase chronology, after Elston (1986) is presented here as taken from Carpenter et al. (2008). The Late Archaic includes Formative and Post-formative cultural traits to acknowledge the agricultural influence towards the end of the sequence (Carpenter et al. 2008).

Pre-Archaic (12,000-7,000 Before Present (BP))

Throughout much of the Great Basin, this period is characterized by various forms of leaf-shaped lanceolate, fluted points, and various stemmed projectile points that make up the Western Pluvial Lakes Tradition, a term used to describe a lacustrine (i.e., resources associated with a lake environment) focus associated with the receding terminal Pleistocene lakes

throughout the Great Basin (James 1981:98). This lifeway emphasized a relatively small set of highly ranked resources which would have been abundant in these wetland settings. During this time, hunting groups apparently made increasing use of small mammals, waterfowl and other birds, and fish (Jones et al. 2003).

Within the Great Basin, sites which date to this period are rarely found (Elston 1986). Pre-Archaic complexes generally tend to be located along the bottomlands and playa margins of the ancient lakeshores of the Lahontan and Bonneville lake systems. The project area lies within a broad, elevated zone which separates these two paleo hydrological systems, and so may not have attracted early settlement for this reason (McGuire et al. 2004).

Early Archaic (7,000-4,000 BP)

A number of researchers have speculated that middle Holocene climatic warming may have either reduced or led to the abandonment of the central Great Basin during this period (Baumhoff and Heizer 1965; Beck 1995; Grayson 1993). Elsewhere in the Great Basin, however, Archaic occupations are widely documented. It is possible that in much of eastern Nevada, prehistoric populations may have sought refuge by moving to the more lush western, northern, and eastern edges of the Great Basin (Milliken and Hildebrandt 1997; Warren 1986). Across the Great Basin, Early Archaic artifact assemblages are more diverse than in the previous period, with grinding tools and intensively used bifaces and scrapers common. These changes are thought to signal resource diversification, as a wider variety of resources including small game, seeds, and pinyon nuts became more important dietary constituents. Atlatls (a device for throwing a dart) and darts replace spears, marked by the appearance of smaller bifurcated base and side-notched dart points, such as Gatecliff Split-stemmed and Northern Side-notched types.

Middle Archaic (4,000-1,500 BP)

Across the Great Basin, the Middle Archaic is seen as a time of cultural florescence, the most dramatic development being the occupation of large semi-sedentary villages. Other distinctive traits include elaborations in material culture, house construction, obsidian tool production, and ceremonial activity directed particularly at the hunting of large game (Hildebrandt and McGuire 2002). For the first time, selected areas in the Great Basin became the focus of representational rock art production,with bighorn sheep a common motif. Split-twig figurines, often in the form of bighorn sheep, also appear in selected caves in the eastern and southeastern Great Basin, an indication of developed ceremonial practices, and additional evidence for the high regard placed on that animal. At the same time, dietary faunal profiles reflect a comparatively sudden shift from large-game (bighorn) to small game, such as rabbits/hares, between 1,000 and 2,000 years ago. Big-game hunting, particularly mountain sheep, remained an important subsistence activity, but sites containing seed processing tools and rabbit bones are fairly common. Across many areas of the Great Basin, projectile points which date to this time period (i.e., Elko series) seem to be more abundant relative to both earlier and later time-period markers (Elston 1986:142). Bennyhoff and Hughes (1987) noted that quantities of imported marine shell beads peak in the Great Basin at the onset of this period, between 3,500 and 3,200 BP. Quarry production and biface manufacturing associated with the major toolstone sources similarly developed to unprecedented levels (Gilreath and Hildebrandt 1997).

Late Archaic (1,500 BP to Euro-American Contact)

The Late Archaic in much of the Great Basin is marked by several technological changes. Around 1,500 years ago, the atlatl and dart were replaced by the bow and arrow, with a concurrent switch to smaller and lighter projectile points (e.g., Rose Spring and Desert series). The focus on flaked tool production techniques changes, from bifaces of quarried raw materials

to simple flake tools using locally available resources (Elston 1986:145). Plant processing equipment becomes more elaborate and abundant, and ceramics appear in the archaeological record after about 900 BP. These changes are accompanied by evidence that more diverse resources were being exploited, as plants and small animals were emphasized in the diet at the expense of large game (Elston 1986:145).

There are indications that Fremont groups came into contact with eastern Nevada groups during this interval. The Fremont consisted of several groups of related semi-sedentary people centered in Utah who relied on a range of subsistence practices, from full-time foraging to full-time horticulture (Hockett and Morgenstein 2003; Madsen and Simms 1998). Archaeological evidence indicates that the Parowan Fremont migrated westward from Utah into the central region beginning about 1,600 BP, displacing Archaic groups. The Fremont disappeared or retracted from the region by about 700 BP, replaced by more mobile hunter and gatherer groups (Marwitt 1986:161). The reason for their decline in the region is not clear, but the Fremont may have simply been out-competed for natural resources by the mobile groups (Bettinger and Baumhoff 1982). The material remains of the Fremont are highly distinctive, particularly Fremont pottery and Fremont-style rock art.

The final group to enter this region, at about 700 BP, was Numic-speaking populations. This group, the Western Shoshone, may have replaced the Fremont and are thought by some researchers (Lamb 1958; Bettinger and Baumhoff 1982) to have expanded east and north from a homeland in southern California. Archaeological literature characterizes Numic groups as having practiced a broad-spectrum, foraging lifeway, concentrating on a greater range of resources that were costly to collect and process, thus out-competing and displacing pre-Numic inhabitants (Bettinger and Baumhoff 1982). The Numic groups who occupied the Great Basin at the time of Euro-American contact were mostly mobile hunters and gatherers who moved in a seasonal pattern. Their contemporary successors continue to occupy the Great Basin.

3.10.3.2 Ethnohistory

At the time of Anglo-american intrusions, most of the project area was occupied by the Southern Paiute and the Western Shoshone (which includes the Goshute and Shoshone). The Western Shoshone traditional lands "extended from the arid reaches of Death Valley ... through the mountainous highlands of central Nevada into northwestern Utah, where it encompassed the area of the [Goshute]" (Elston 1986:262). Traditional lands of the Goshute Shoshone extend west from Utah, with a few Goshute settlements occurring as far west as Egan Canyon. In southern Nevada, the traditional use areas for the Western Shoshone and Southern Paiute meet in the general vicinity of the Lincoln-Clark county line. The Western Shoshone and Southern Paiute interacted extensively along this territorial boundary.

In eastern Nevada, as throughout much of the Great Basin, Native American groups were commonly referred to according to their major subsistence resource or by a key natural feature of their environment. Consistent with that tendency, ethnographic literature refers to the Goshute Shoshone in the northern portion of the project area as Kusiutta, meaning "desert people or dust something"; the Pa'anaihteen, or "people from up above" inhabited Steptoe Valley; the Taintenkateen, meaning "hole" or "cave," was applied to those in Cave Valley. The sociopolitical groups that Julian Steward (1938) described for this area in the early twentieth century indicates various Native American bands' and tribes' autonomy or cohesiveness. For this region, Steward presents stand-alone characterizations for the Goshute, those centered in Steptoe Valley, and those in Cave Valley, while groups in Spring, Snake, and Antelope valleys

are considered together; and the Pahrump and Las Vegas bands of Southern Paiute are also considered together.

Pre-contact Western Shoshone and Southern Paiute are described as fairly uniform cultures with only minor local variations, based entirely on hunting and gathering. The Western Shoshone hunted and gathered in family areas based on yearly cyclical migration patterns. The bands lived in widely scattered winter villages consisting of a few families, coming together for communal activities (Steward 1938). Native lifeways were initially disrupted in the 1820s with the appearance of trappers and explorer; and largely restructured with the development of local mining and ranching/farming operations.

3.10.3.3 History

Histories of the area have been written (James 1981; Angel 1958; Elliot 1987) and will not be reiterated here. Following is a brief summary of history pertinent to the resources in the project area.

Transportation and Communication

The early history of Nevada is tied to the major transportation corridors linked to substantial settlements outside of the state. Early Nevada settlements developed astride these transportation corridors. Trails, roads, and, later, railroad lines were the initial conduits for importing the foods and supplies necessary to survive in this harsh environment. Later, these same corridors carried food and mineral resources out of the area.

The California Gold Rush of 1849 spurred the formation of transportation and communication routes through Nevada. These routes generally ran east-west across the state. From the late 1840s until the introduction of the railroads in the late 1860s, the California Trail was an emigrant route that crossed from Missouri to California, through northern Nevada. It was used by more than 250,000 farmers and gold-seekers to reach the California gold fields and farm homesteads in California. The original route had many branches and encompassed more than 5,000 miles of trails. Many miles of the rutted traces of the trail remain throughout the Great Basin as evidence of the westward migration.

From 1851 to 1858, the overland mail service followed either the Humboldt River route that linked Salt Lake City to northern California, or the Mormon Trail route that linked Salt Lake City to southern California (San Bernardino). In 1855, Major Howard Egan, a Mormon pioneer, laid out a third trail through northern Nevada.

Egan's Trail went through what became Schellbourne in the northern Schell Creek Range and continued west through Egan Canyon/Egan Pass in the Egan Range. The northern leg of Simpson's route as well as the Pony Express route followed a similar path through northern White Pine County. Further west, Egan's Trail drops to the south; US-50, the Lonliest Road in the West, roughly follows Egan's Trail through central Nevada.

The Pony Express lasted a short 19.5 months until November 20, 1861. By this time, the telegraph was being constructed along the side of the trail. The combination of the telegraph, the Civil War, and other economic factors caused the downfall of the Pony Express.

The Central Pacific Railroad was the western half of the first intercontinental railroad. Construction began in Sacramento and continued eastward until it reached the Union Pacific Railroad in Utah in 1869 (Elliott 1987). Its route coursed through northern Nevada, generally following the Humboldt River. The railroad dramatically changed settlement, transportation, and commerce patterns in Nevada, particularly for eastern Nevada. Various towns were established along the railroad, the most important of which was Elko. While some freight and stage lines

were abandoned, others were established to connect far-flung mining districts to the railroad. Several lines ran between the major communities, such as the systems linking Wells via Ely to Pioche to the south, and Ely to Eureka to the west (Vlasich 1981:233). Railroads such as the Nevada Northern Railway (NNRy) that is within the project area, was one such line.

The planning and construction of the NNRy began at the turn of the century, with the intent of linking the Southern Pacific between Wendover and Wells, to Ely 140 miles to the south. Via this transportation system, commercial exploitation of the copper deposits in the mountains next to Ely would be most profitable. On June 1, 1905, the NNRy formally incorporated, and the first train ran in May 1906 on the first section completed between Cobre and Currie. The next 77 miles, between Currie and Ely were completed in September 1906. There were ten sidings or stations on this line. At the north end was Cobre where the NNRy met the Southern Pacific Line. Then moving south, Shafter, Dolly Varden, Currie, Greens, Cherry Creek Station, Steptoe, McGill, Ely, and Veteran were built.

Mining

Mining was probably the largest catalyst for settlement in this region. As alluded to above, by 1870, Elko had become the entry point for commerce from the east. Roads led from Elko southward to mining districts in Steptoe Valley such as Duck Creek in 1869, Schellbourne in 1871, and Ward in 1872 (Hall 1994; Myrick 1992). The Cherry Creek mining district also formed in 1872, and was situated approximately 50 miles north of Ely. This was one of the chief mining camps of White Pine County until 1883 (Carlson 1974). In 1887, the White Pine County seat was moved from Hamilton to Ely.

From Ely to the south, the following historic mining districts are in proximity to the project alignment: Currant Mining District, overlapping the White Pine and Nye county lines, in its heyday from 1914 into the 1950s; the Silver King Mining District, at the south end of the Schell Creek Range, most active in the 1870s; and a cluster of mines in the general vicinity of Pioche, including, Ely Springs, Bristol, Highland, Pioche, and Comet districts, active from the 1870s into the 1910s. In 1907, when a branch line off of the Salt Lake to Los Angeles main line went through to Pioche, the town again prospered. That period of prosperity lasted until the Depression struck in the 1930s.

In the central portion of the project area, other mining districts formed. Silver was discovered at Pioche in 1863-64 and a mining district organized here the following year. By 1870, two more companies, the Raymond & Ely Mining Co., and the Meadow Valley Mining Co., started production, and large amounts of silver were mined and hauled to the mills by wagon (Paher 1971). The nearby Logan Mine was another short-lived prospect, starting in 1865 but lasting only four years. Located on the eastern slope of Mt. Irish, this mine, along with Hiko and Crystal Spring, was part of the Pahranagat District.

Gold was discovered in the Delamar area in 1890-91, with a district being formed the next year. The Ferguson (Delamar) District included Ferguson, Golden City, and ultimately Delamar in 1893. John DeLamar bought the claims in 1893 to develop the town and mine. By 1895, the Delamar Mine was the largest producer, providing more than half of the ore in Nevada. The town burned in 1900, causing DeLamar to sell it shortly thereafter. Under new owners, the Delamar District still ranked third in production, after Goldfield and Tonopah to the west.

Throughout the end of the nineteenth century, the Ely Mining District enjoyed only moderate success. However, by the start of the twentieth century, copper was king, thanks to rich copper deposits discovered in Ruth in 1902, and to the ability to transport it to market via the NNRy.

Ranching and Farming

Ranching in the west can be divided into two gross categories with several time periods and sub-themes (Sayre 1999; White 1991). These categories are open-range grazing, and government regulated and fenced ranching. The open-range grazing period was well-established in Nevada by the late 1870s after the introduction of cattle on the range, and continued until the Taylor Grazing Act of 1934. Cattlemen could obtain land through the 1862 Homestead Act, which provided 160-acre parcels; the Timber and Culture Act of 1873, which increased the amount of land if the owner planted 40 acres of trees over time; and the Desert Land Act of 1877, which expanded acreage to 640 due to the lack of water in the west. The land had to be irrigated and a small per-acre fee was assessed. Along with these homesteading acts, land was "claimed" simply by its use. The rancher "owned" cattle-occupied lands. The lack of fencing until around the end of the nineteenth century created situations where more than one rancher's cattle were using any given parcel. This open-range situation created a problem of overgrazing because each ranch put the maximum number of cattle there. Periodic round-ups moved the cattle to market.

Our thumbnail review of the era of open-range grazing extends from the first arrival of livestock in Nevada until the 1930s. Up until the 1850s-1860s, the few activities involving livestock were small in scale. The first livestock in Nevada was brought along with fur trappers in 1826-1827. Jedediah Smith and Peter Ogden brought in horses and mules for use during their expeditions. Next, a flock of about 150 sheep crossed the southern tip of what would become Nevada in 1841, by William Rowland and John Workman's group of emigrants. Ten years later sheep were brought into central Nevada by Captain Lorenzo Sitgreaves. During the 1850s and 1860s, large herds of cattle and flocks of sheep were regularly being moved along the Humboldt Trail, though most of these were headed for California.

On the local front, ranching efforts were first established shortly after the Civil War, with Texas longhorns brought into Elko (Vlasich 1981:256). This was in step with when the livestock industry began to flourish in Nevada. From here forward, the viability of the livestock industry as well as farming were directly linked to mining activities. Minerals discovered in central Nevada prompted the founding of the town of Austin in 1864, and on the heels of that discovery, the Pioche (1866) and Delamar Mines developed in south-central Nevada. Farms quickly sprouted up in the surrounding areas, providing food for the influx of miners. Some of the earliest farms in the project vicinity developed in Meadow and Pahranagat valleys. Agriculture interests also followed mineral development in Ione in 1863 and Belmont in 1865 in Monitor Valley. Newark Valley provided meat and produce for the Eureka and Hamilton mining districts in 1866. Steptoe Valley was settled in 1868 after minerals were found in the Robinson District. Throughout the 1860s, Nevada's population jumped six fold, growing from 6,900 to 43,000 by 1870.

By 1870, climate and political factors started the migration of the livestock industry out of neighboring California. The result was a very rapid expansion of the livestock industry into Nevada (Seymour et al. 2006). It was during this period that this economic enterprise developed distinct geographic regions: north of the Humboldt, the Central Region, and the Southern Region. Because trailing sheep to market was difficult and reduced the profit margin, shipping centers developed near the great ranches at Elko, Wells, Battle Mountain, Winnemucca, and Reno.

The construction of the Central Pacific Railroad across the state in 1869 gave ranchers and farmers access to markets that were previously much more difficult to reach (Patterson et al. 1986). Ranches along its routes grew and new ones sprouted up. Dangburg in the Carson Valley and John Sparks in Elko County were among those who benefited greatly. In Spring

Valley in White Pine County, Abner C. Cleveland developed a large ranch in the 1870s. No longer were ranches supplying just local mines since now they had access to markets in California and the east.

The decline of mining activities in the 1880s caused the livestock industry to readjust statewide. Many who had made a living from mining now looked to ranching as an alternative. The number of cattle and sheep skyrocketed during the decade while the price per head went down. To compound the ranchers' problems, a disastrous winter of 1889-1890 forced many of Nevada's ranchers to switch from cattle to sheep, which were more suited to the forage of the Great Basin (Young and Sparks 2002). That extraordinarily harsh winter caused the die-off of hundreds of thousands of cattle throughout the west. After the extremely cold winter, vegetation that grew back first was substantially different than that of years before. This was due in part to overgrazing in the prior several decades, vegetation now unchecked by grazing, and an atypical wet period for the three years following that cold winter. The harsh winter of 1889 taught the cattlemen a lesson: the era of free range with unlimited cattle was over. They learned that, in order to effectively raise cattle, they must supplement wild forage with hay. During the 1890s, many ranchers switched to sheep, which caused friction between cattle and sheep ranchers. When mining again became lucrative in the early 1900s, livestock also became more profitable.

The landscape of the west had only begun to recover from the end-of-the-nineteenth-century damage wrought by drought and too many animals, when rebounding herd sizes in the 1920 and 1930s yet again caused severe overgrazing. At this point, the era of open-range grazing rapidly gave way to the era of government-regulated and fenced ranching. In response to overgrazing, the Taylor Grazing Act of 1934 was signed by President Roosevelt. This legislation was intended to "stop injury to the public lands by preventing overgrazing and soil deterioration; to provide for their orderly use, improvements, and development; and to stabilize the livestock industry dependent upon the public range" (Sayre 1999).

Because it changed the way the government managed federal land, the Taylor Grazing Act of 1934 was probably the most significant federal legislation the West had seen to date. For one, it essentially ended the Homestead Act, and then, for the first time, the federal government asserted authority over the "Public Domain." In the years leading up to this legislation, state and federal interests debated how to use and control western lands. This legislation ended that debate. Some feel that this is the time when the range was locked up, while others consider this as when the cattle industry "captured" the federal administration of the range, "protecting" neither the land nor the public interest. Livestock associations were encouraged to organize and seek local oversight. Rather than unorganized use, livestock interests capitalized on an informal form of oversight that pushed their agenda onto the lands over others' (Merrill 2002).

3.10.3.3 Previous Research

Records searches of the project area, and areas surrounding it, were conducted at the Ely and Elko District Offices of the Nevada BLM, the Harry Reid Center of Environmental Studies at the University of Nevada, Las Vegas (UNLV), and data incorporated in the Nevada Cultural Resources Information System (NVCRIS). Results plotted on USGS topographic quadrangle base-maps covering the project area were reviewed to identify previously documented sites and cultural resource studies completed within 1 mile of project components. A supplemental review of the General Land Office (GLO) maps determined historical land ownership and locations of potential historic-period sites within 3 miles of project components.

Regarding pre-existing sensitivity classification for portions of the project area, the majority of the project components fall within the Spring/Steptoe Valley Analytical Unit for the Great Basin

Restoration Initiative-Cultural Resources Landscape Level Planning Model (Drews et al. 2004). Goshute Valley and the northern end of Steptoe Valley are classified as having medium archaeological sensitivity; the remainder of Steptoe Valley is classified as having high archaeological sensitivity (Drews et al. 2004: Figure 5.37). The southern end of Steptoe Valley was also evaluated for the Draft Ely Resource Management Plan (Ely Proposed RMP/Final EIS was released in November 2007) though different variables were taken into consideration, resulting in a classification of moderate archaeological sensitivity (Drews and Ingbar 2004).

These searches revealed that in total, 308 inventories have been conducted within 1 mile of the project area resulting in the documentation of 1,006 cultural resources, of which there are 758 sites and 187 isolated artifacts (Carpenter et al. 2008). An additional 61 sites have no information beyond being plotted on the BLM base maps. Of the 758 sites of known type, 79 percent contain a prehistoric component.

3.10.3.4 Cultural Resource Inventory Results

Field Inventory

As required by federal historic preservation laws, archeological field investigations of the project area components were conducted between January and October 2007. A Class III level inventory was conducted on substantial portions of the proposed EEC project, including the proposed and alternative power plant sites, with a robust sample of the linear components (i.e. transmission lines and water supply lines). Six project specific inventories were conducted for this Project (Duke et al. 2007; JRP 2007; Seymour et al. 2007; Seymour and Gilreath 2007; Young 2007; Young et al. 2007;), and included approximately 19,000 acres of Class III survey. Some of the project components had 100 percent inventory coverage, others did not. For those components with little or no inventory coverage, comparable adjacent field survey data exist. Data from the project-specific and adjacent studies were incorporated into a sensitivity analysis as described below. Project components, or portions thereof, not included in field investigations would be subject to Class III inventory as project planning proceeds and prior to any ground disturbing activities in those locations.

The findings from the EEC project-specific inventories, combined with recent findings from the proposed White Pine Energy Station Project (Deis 2006), the associated transmission line ROW in the SWIP Corridor (Crews et al. 2007), and the NNRy reconstruction ROW (Southworth 2008), provide sufficient information to analyze the EEC project's potential affect on cultural resources. Certain aspects of the project remain conceptual or in preliminary design pending completion of the EIS and project design finalization. As outlined in the Programmatic Agreement, all elements of the final design would be fully inventoried and Section 106 satisfied prior to any Project related disturbance.

The EEC electric transmission lines that are within the SWIP Corridor were not inventoried since a 200-foot wide corridor within the SWIP Corridor has recently been inventoried as part of a separate project (Crews et al. 2007) and provides information useful for assessing SWIP Corridor-wide sensitivity. Future ROWs within the SWIP Corridor will be subject to Class III inventory as project planning proceeds.

An archaeological inventory of the NNRy has recently been conducted (Southworth 2008) to support the planned upgrade of the railroad (see **Chapter 2**). The impacts of the NNRy reconstruction project are being analyzed under an Army Corps of Engineers NEPA document (Corps 2008). As stated in the Programmatic Agreement, the Ely BLM has assumed responsibility for completing the Section 106 compliance for the railroad reconstruction.

No TCPs have been identified in the project area by previous studies. However, an ethnographic study is currently being conducted along the Alternative Rail Line route to aid in the identification of any TCPs that may be present.

Archaeological Sensitivity Analysis

An archaeological sensitivity assessment was derived from the current and relevant previous Class III level inventory results for the project area and adjacent lands (see keystone studies in Carpenter et al. 2008). These ten keystone studies (Ataman et al. 2002; Schroedl 2002; Crews et al. 2007; Deis 2006; Duke et al. 2007; Seymour and Gilreath 2007; Seymour et al. 2007; Young 2007; Young et al. 2007; Southworth 2008) report on the findings for approximately 45,321 acres containing 683 prehistoric site components and 167 historic period components.

Using site types and those sites determined or recommended eligible to the NRHP, density estimates for the number of acres of NRHP-eligible sites per square mile were made (Carpenter et al. 2008). Each of the various project components was then ranked according to its prehistoric and historic archaeological sensitivity. The sensitivity ranks are defined in **Table 3.10-1**. Overall, historic site counts and the number of NRHP-eligible historic period sites are low, precluding classification using the same methods developed for the prehistoric sites (Carpenter et al. 2008), therefore a simplified method was developed. Sensitivity rankings for historic sites takes into account both number of eligible sites and proximity to sensitive areas related to specific themes of transportation/communication, mining, and farming/ranching.

TABLE 3.10-1. ARCHAEOLOGICAL SENSITIVITY RANKING

SENSITIVITY RANK	DESCRIPTION
PREHISTORIC ARCHAEOLOGY	
Low	Less than 1 acre of NRHP-eligible sites per square mile
Moderate	1 to 7.5 acres of NRHP-eligible sites per square mile
High	7.5 to 15 acres of NRHP-eligible sites per square mile
Very High	15+ acres of NRHP-eligible sites per square mile
HISTORIC ARCHAEOLOGY	
Low	Few if any NRHP-eligible sites
High	Several NRHP-eligible sites and/or proximity to significant transportation corridors or historic mining districts

Nine general prehistoric site types were recognized based on artifact composition, site size, and the toolstone utilized. These include complex feature/artifact assemblage, simple/complex flaked stone, linear feature/assemblage, simple milling equipment, simple pottery assemblage, toolstone quarry, segregated reduction location, isolated thermal feature, and isolated artifact. Simple flaked stone scatters comprise 79 percent of prehistoric sites within the keystone studies (Carpenter et al. 2008).

The historic-period sites were generally classified into nine types and then associated with historical themes. The site types include charcoal feature/debris, residential features/debris, temporary occupation/debris, transportation feature/debris, trash scatter/debris, mining feature, ranching feature/debris, conservation feature, and isolated find. The historic themes include exploration, transportation, mining, farming/ranching and grazing, government and politics, and leisure and recreation. Most of the historic period sites (62 percent in keystone studies; Carpenter et al. 2008) are simple trash scatters that are difficult to link to any one historical theme. The next most common historic-period sites are transportation-related features.

Historic sensitivity determinations include proximity to significant transportation corridors or historic mining areas. There are a number of major travel corridors in the general area including the NNRy (and associated sidings and other features), the Pony Express/Egan Trail corridor,

the transcontinental telegraph line following the same corridor, the Lincoln Highway, the Midland Highway, and an old alignment of US-93. Outside the project area to the north is the California Trail. Outside the project area to the south there is the San Pedro, Los Angeles, and Salt Lake Railroad, the Old Spanish Trail/Mormon Road, and the Arrowhead Highway. In addition there are several mining districts in and adjacent to the project area including Granite, Currie, Silver King, Delamar, and Meadow Valley districts.

3.10.3.5 Historical Resources within the Viewshed

The historic resources viewshed analysis area was based on two criteria: 1) the location of historic resources anticipated to be within view of either the South Plant or North Plant Sites; and 2) the Steptoe Valley watershed planning area as recognized by the BLM Ely District Proposed Resource Management Plan and Final EIS (BLM 2008a). The historic resources evaluated include buildings and structures related to the ranching, agricultural, and rural residential development in Steptoe Valley and were built between 1858 and the 1960s. The non-ranching properties are related to transportation and associated development, or mining townsite development. These resources are elements of the Steptoe Valley historic landscape.

Historic architectural resources in Steptoe Valley had not previously been subject to comprehensive inventory and evaluation surveys; however, some resources had been previously surveyed individually, or as part of larger districts or systems, and a few had been found eligible for or are listed on the NRHP and/or National Historic Landmark (NHL). Two resources, the Schellbourne Ranch and the shops and yards property associated with the NNRy, have been formally listed in the NRHP. The NNRy shops and yards property, located in East Ely, was also designated as a NHL in 2006. The linear resources considered in the indirect effects analysis (JRP 2007, p5) have been the subject of multiple previous studies: the Pony Express Trail has been designated a National Historic Trail; and the National Park Service concluded that the Lincoln Highway does not meet all criteria for NHL designation within the National Park System (NPS 2004), however segments of it have been listed and/or recommended eligible for the NRHP. According to the Nevada State Historic Preservation Office (SHPO), the town of McGill appears to be an eligible historic district. Further, one ranch was included in a study completed by the University of Nevada-Reno.

Thirty-two historic resources were reviewed in the analysis area; these are described and evaluated in detail in the *Intensive Historical Resources Inventory, Evaluation, and Indirect Effects Analysis* report (JRP 2007). The historic resources include 22 ranches, 1 station, 2 towns, 1 CCC Camp, 1 roadside commercial building, 2 railroad sidings, 1 trail, 1 road, and 1 railroad (**Table 3.10-2**). The segment of Lincoln Highway through the project area parallels US-93 to the east and then becomes US-93 just north of McGill. The Pony Express Trail traverses east-west through the project area south of Cherry Creek. The NNRy runs north-south through Steptoe Valley.

The ranches, linear transportation features, and townsites in the project area are the physical evidence of the lives and work of the people who settled in Steptoe Valley—those who developed and shaped the land to serve human needs. This development created the Steptoe Valley Historic Landscape, a system of linked components that is clearly understood through its contributing elements. The contributors to the landscape are those ranches, linear transportation features, and townsites that have both significance and historic integrity and, although individually eligible for the NRHP, collectively form the interrelated system, or district, that is the historic landscape. Steptoe Valley, specifically approximately 60 miles of the watershed north of Ely, Nevada, appears to be a historic rural landscape because it is a

geographical area that people have historically shaped and modified through their activities and occupancy of the land (JRP 2007).

TABLE 3.10-2. HISTORIC RESOURCES EVALUATED

RESOURCE TYPE	NUMBER	ELIGIBLE	NOT ELIGIBLE
Ranch	22	15	7
Station	1		1
Town	2	2	
CCC Camp	1	1	
Roadside Commercial Bldg	1		1
Siding	2		2
Trail	1	1	
Road	1	1	
Railroad	1	1	
Total	32	21	11

Source: JRP 2007

The Steptoe Valley Historic Landscape encompasses ten of the eleven characteristics (land uses and activities; patterns of spatial organization; response to natural environment; circulation networks; boundary demarcations; vegetation related to land use; buildings, structures and objects; clusters; archaeological sites; and small-scale elements) that the NPS has identified as important for such properties and is recommended eligible for listing on the NRHP under Criteria A and C, at the local significance level, for the period between 1858 and 1958 (JRP 2007). The landscape characteristics resulted from the development of transportation, mining, settlement, and ranching in the valley (Criterion A), which are recognized important historic themes of development in Nevada. The contributing elements of the landscape made direct contributions to the local economy within each of these themes. Under Criterion C, the Steptoe Valley Historic Landscape consists of a system of interrelated contributing elements that illustrate historic local and regional trends. The landscape and its contributing elements retain integrity of spatial organization, land use and activities, response to the natural environment, and circulation networks, all of which are still evident. The association and integrity of the contributing ranches, linear resources, and townsites, and their relationship and linkage to each other in the valley, allow these resources to convey the significance of the landscape.

3.10.4 Specific Project Area Conditions

The following descriptions of prehistoric and historic archaeological sites and sensitivities are taken from the project specific inventories and sensitivity modeling analysis discussed in **Section 3.10.3.4**. For areas not inventoried, sensitivity modeling was deemed appropriate at this stage of the planning process for providing the baseline data. See **Section 3.10.3.4** for information regarding the sensitivity analysis.

BLM review of the cultural resource inventory reports is on-going and the formal determinations of National Register eligibility may differ from the recommended eligibilities noted below.

3.10.4.1 Plant Sites

South Plant Site

A total of seven sites were recorded within the South Plant Site. None of the sites documented met the criteria for eligibility to the NRHP. Two sites were recorded in the South Plant Site

worker village area; neither are NRHP-eligible. No eligible cultural resource sites were recorded in the South Plant Site or the associated worker village.

Three sites were encountered within the Mt. Wheeler Transmission Line ROW from the Gonder Substation to the South Plant Site, two of which are eligible for the NRHP (NNRy and the Lincoln Highway).

The historic resources viewshed study (JRP 2007) notes that five historic resources (three ranches, one road, and one railroad) recommended eligible for the NRHP are located within 5 miles of the South Plant Site. Another three eligible historic resources (two ranches, one town) are within 5 to 10 miles of the plant site.

North Plant Site

The inventory of the North Plant Site encountered 39 cultural resource sites. Six of these sites are eligible for the NRHP. No cultural resource sites were recorded in the associated worker village area.

The findings for the Mt. Wheeler Transmission Line include the same three sites as described under the South Plant Site with an additional two sites within the segment to the north. Of these five sites, three are eligible for the NRHP. From the South Plant Site to the north, the Mt. Wheeler Transmission Line occurs within and follows the Lages Station Water Line ROW to the North Plant Site and on to the Lages Station Well Field. See discussion in **Section 3.10.4.3** Water Facilities for that site data.

The Indirect Effects Study (JRP 2007) notes that four historic resources (two ranches, one road, and one railroad) recommended eligible for the NRHP are located within 5 miles of the North Plant Site. Another four eligible historic resources (three ranches, one town) are within 5 to 10 miles of the plant site.

3.10.4.2 Electric Transmission Facilities

Segment 1A

Six cultural resource sites were documented along Segment 1A. Three of these sites are eligible for the NRHP. The Pony Express Trail, an eligible site, crosses Segment 1A. Other known historic resources in the area include the NNRy.

Segment 1B

Numerous cultural resource sites, including the Pony Express Trail and the NNRy, are located along or are intersected by Segment 1B; six of these sites are eligible for the NRHP.

Segment 1C

There is no project specific site data for this segment. Based on the sensitivity analysis, this segment has low prehistoric and high historic archaeological sensitivity.

Segment 1D

There is limited project specific site data for Segment 1D. Known historic resources in the area include the Lincoln Highway and the Granite Mining District. The sensitivity analysis indicates that this segment has high prehistoric and high historic archaeological sensitivity.

Segment 1E

There is limited project specific site data for this segment. Known historic resources in the area include the Lincoln Highway. The sensitivity analysis indicates that this segment has low prehistoric archaeological sensitivity and low historic archaeological sensitivity.

Segment 1G
There is no project specific site data for this segment. Known historic resources in the area include the Lincoln Highway. Based on the sensitivity analysis (Carpenter et al. 2008), this segment has high prehistoric and low historic archaeological sensitivity.

Segment 3
A total of seven sites were documented along Segment 3; none are recommended NRHP-eligible. Known historic resources in the area include the NNRy.

Segment 4A
Four sites were encountered along this segment. None of the sites are recommended eligible for the NRHP. Known historic resources in the area include the NNRy.

Segment 6A
Six sites were documented along Segment 6A. One site has been recommended eligible for the NRHP.

Segment 6C
There is no project specific site data for this segment. Known historic resources in the area include the Midland Highway, the Currie Mining District, and ranching/farming. According to the sensitivity analysis, the segment has very high prehistoric and high historic archaeological sensitivity.

Segment 8
There is no project specific site data for this segment. This segment has low prehistoric and low historic archaeological sensitivity Segment 9A.

Segment 9A
No sites were encountered along Segment 9A.

Segment 9B
There is no project specific site data for this segment. Based on the sensitivity analysis, this segment has low prehistoric and low historic archaeological sensitivity.

Segment 9C
There is no project specific site data for this segment. The sensitivity analysis indicates this segment to have low prehistoric and low historic archaeological sensitivity.

Segment 9D
There is no project specific site data for this corridor segment. Known historic resources in the area include the historic route of US-93. Based on the sensitivity analysis, this segment has very high prehistoric archaeological sensitivity and high historic archaeological sensitivity.

Segment 10
A total of 35 sites were documented along Segment 10. Ten of the sites are recommended eligible for the NRHP.

Segment 11
There is no specific site data for this segment. According to the sensitivity analysis, this segment has high prehistoric and low historic archaeological sensitivity. The Old Spanish Trail and Mormon Road are well to the southeast of this area.

Robinson Summit Substation
Nine cultural resource sites are present in the Robinson Summit Substation area. Two sites are recommended eligible for the NRHP.

Harry Allen Substation
No cultural resource sites were encountered in the Harry Allen Substation expansion area.

3.10.4.3 Water Supply Facilities

Lages Station Well Field
This area has not been inventoried for cultural resources. The sensitivity analysis indicates that the area has moderate prehistoric and low historic archaeological sensitivity.

Coyote Valley Ranch Well Field
This area is essentially the same as the South Plant Site worker village; two historic sites are present, neither of which are recommended eligible for the NRHP.

Lages Station Waterline (includes the North Well Field, Middle Well Field, South Well Field, and Limited South Well Field)
A total of 46 sites were encountered along the Lages Water Line. Eleven of these sites are recommended eligible for the NRHP. Known historic resources in the area include the Pony Express Trail which would cross the Lages Station Water Line.

Duck Creek Waterline
Four historic sites are present along the Duck Creek Water Line. Two sites are eligible for the NRHP. Known historic resources in the area include the Lincoln Highway.

3.10.4.4 Rail Facilities

Alternative Rail Line
There are 54 cultural resource sites along the Alternative Rail Line from Shafter to the Lages Station area. Ten of these sites are recommended eligible for the NRHP. The remainder of the rail line is the same as the Lages Station Water Line, see discussion above. Known historic resources in the area include the NNRy and the Pony Express Trail. The Pony Express Trail would be crossed within the Lages Station Water Line segment.

North Plant Site Rail Lead
There are six sites within the rail lead, one of which has been recommended as eligible for the NRHP. Known historic resources in the area include the NNRy.

South Plant Site Rail Lead
Two sites were encountered in the South Plant Site Rail Lead. One of these sites is recommended as eligible for the NRHP. Known historic resources in the area include the NNRy.

3.11 Native American Concerns

Federal agencies are required by law (including the National Historic Preservation Act of 1966 and Archaeological Resources Protection Act of 1979) to consult with Native Americans on actions that may affect their traditions or uses of public lands. Specifically, the agencies are required to follow the Section 106 process as recorded in 36 CFR 800 - Subpart B which requires them to, not only take into account effects of their undertaking on (cultural resource) properties eligible for the National Register of Historic Places (see **Section 3.10**), but to consult with the appropriate tribes in order to assist in identifying potentially eligible properties and the values that make them eligible. As stated in 800.2(c)(2)(ii)(A), the agency must provide tribes a reasonable opportunity to identify its concerns about historic properties, advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, articulate its views on the undertaking's effects on such properties, and participate in the resolution of adverse effects.

The American Indian Religious Freedom Act of 1978 states "...henceforth it shall be the policy of the United States to protect and preserve for American Indians their inherent right and freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites [42 U.S.C. 1996]." Agencies are required to review their policies and procedures in consultation with traditional native religious leaders.

Executive Order (EO) 13007 - Indian Sacred Sites, requires agencies to accommodate access to and ceremonial use of Indian sacred sites and to avoid adversely affecting the physical integrity of these sites. According to EO 13007, a sacred site is defined as "any specific, discrete, narrowly delineated location on federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." Sacred sites may consist of a variety of places and landscapes.

There are many places on federal lands where Indians practice their religions. Many of the lawful activities that are permitted and authorized on federal lands can compromise the integrity of sacred places and the privacy of religious practices. With this in mind, EO 13007 was signed, "in order to protect and preserve Indian religious practices." The order obligates federal land managers to work with Indian tribes to help protect their basic rights and practice their religions.

Further, Executive Order 13175 - Consultation and Coordination With Indian Tribal Governments (which supersedes EO 13084) provides fundamental principles for agencies to follow when formulating or implementing "policies that have Tribal implications," which refers to regulations, proposed legislation, other policy statements, or actions that have substantial direct effects on Tribes or the distribution of power and responsibilities between federal government and Indian Tribes.

The Department of the Interior (DOI) Departmental Manual 512 DM 2 requires that all bureaus within DOI develop policies and procedures to identify, conserve, and protect Indian Trust Assets, trust resources, and tribal health and safety. Indian Trust Assets are legal interests in assets held in trust by the United States for Indian Tribes or individuals and can include minerals, hunting and fishing rights, and water rights.

The goal of the BLM Manual Section 8120 is to "assure that tribal governments, Native American communities, and individuals whose interests might be affected have a sufficient opportunity for productive participation in BLM planning and resource management decision making." To this end, the BLM has engaged in consultation with the Native Americans associated with the area.

3.11.1 Area of Analysis

For the purposes of this analysis, the project area includes an approximately 10-mile-wide corridor centered on the components of the EEC project area.

3.11.2 Data Sources and Methods

Data regarding Native American Concerns relied on the BLM tribal liaison's knowledge of and familiarity with places and resources of Native American interest and concern within their District. Further, data was gathered and supplemented by reviewing available ethnographic and ethnohistoric reports produced for previous federal undertakings in the vicinity of the EEC

project area (Bengston 2007). Considerable reliance was placed on the ethnographic overview (Woods 2003) recently completed for the Ely district-wide RMP, as the majority of the EEC project falls within that study area. An additional ethnographic study is currently being conducted for the project components within a portion of the BLM Elko District as there is a paucity of ethnographic data for this area.

3.11.3 Existing Conditions

Government to government consultations are maintained and facilitated by the lead agency, Ely District BLM, and the Elko District BLM through regularly scheduled (quarterly) open tribal meetings. These meetings allow the agencies to brief tribes on the environmental analysis process, proposed projects, provide an opportunity to discuss tribal concerns, and exchange information. Presentations, agency-tribal meetings, and verbal and written communication have been utilized to keep the Tribes informed and apprised of the project.

The public scoping letter for the EEC Project was sent to tribes and tribal organizations on January 26 2007. Tribal liaisons have regularly briefed tribes on the EEC Project since then. The tribes received a second correspondence letter (EEC Project Notice) regarding the project on the May 4, 2007. As part of Government-to-Government consultation, Native American consultation letters were sent out by the BLM, Ely District Office on July 23, 2007 to the Tribes and tribal organizations listed in **Table 3.11-1**. The concerns outlined in the responses are summarized in **Table 3-11-1**.

Meetings were held with the Goshute Tribal Council on February 8, 2007 and March 14, 2008 that included the BLM, the Goshute Tribal Council, and Nevada Power. A meeting was held with the Ely Shoshone Tribe on April 4, 2007 that included the Tribal Staff, Tribal Chair, and Sierra Pacific. A meeting with the Kaibab Paiute Tribe was held on July 18, 2007 during the Tribal Council Meeting. The purpose of the meetings was to brief the Tribes on the environmental analysis process, the proposed EEC Project, and to answer questions.

At the Wells Band Tribal Council meeting held on February 1, 2008, the tribe expressed concern regarding woodland products and the seasonal pine nut harvest within Elko District BLM lands. Their concerns included access into these areas to harvest woodland resources and potential environmental effects of the project on healthy woodlands.

Additional activities/contacts with Tribes are noted in the Project Record. **Table 3.11-2** provides a summary of the formal communications that have taken place with the Native American Tribes for this project.

TABLE 3.11-1. NATIVE AMERICAN TRIBES/TRIBAL ORGANIZATIONS CONSULTED

TRIBE OR GROUP		CONCERNS EXPRESSED
ARIZONA		
Colorado River Indian Tribes		No concerns at this time.
Kaibab Paiute Tribe		Expressed interest and ongoing participation.
CALIFORNIA		
Timbisha Shoshone Tribe		
NEVADA		
Duck Valley Shoshone-Paiute Tribes		
Duckwater Shoshone Tribe		Cultural resources, environmental justice, critical habitat for sage grouse, medicinal and food plants used by the Western Shoshone, cumulative impacts to Tribes
Ely Shoshone Tribe		Location of the EEC in relation to Parcel 4 of the lands transferred to the tribe and placed in trust in the 2006 White Pine Land Act
Las Vegas Paiute Tribe		
Moapa Band of Paiutes		
Pahrump Paiute Tribe		
Shundahai/Western Shoshone		
Te-Moak Tribe of Western Shoshone (including)	Battle Mountain Band	High water use to run power plant; lower water table could affect vegetation
	Elko Band	
	South Fork Band	
	Wells Band	Pine nut harvesting areas could be impacted; air quality could be impacted
Yomba Shoshone Tribe		
UTAH		
Confederated Tribes of the Goshute Reservation		
Paiute Indian Tribe of Utah (including)	Cedar Band	
	Indian Peaks Band	
	Kanosh Band	
OTHER TRIBAL ORGANIZATIONS		
Bureau of Indian Affairs, Eastern Nevada Agency		
Bureau of Indian Affairs, Southern Paiute Agency		
Western Shoshone Defense Project		

TABLE 3.11-2. SUMMARY OF MEETINGS WITH NATIVE AMERICAN TRIBES

PARTIES INVOLVED	DATE
Goshute Tribal Council, BLM, Nevada Power	February 8, 2007
Ely Shoshone Tribe, BLM, and Sierra Pacific	April 4, 2007
Kaibab Paiute Tribe and BLM	July 18, 2007
Te-Moak Tribe of the Western Shoshone Tribe Wells Band Tribal Council and BLM	January 31, 2008
Goshute Tribal Council, BLM	March 14, 2008
Goshute Tribe, Wells Band, Duckwater Shoshone, BLM, Ethnographer	July 15, 2008

Data gathered during past consultation with tribal governments was summarized in a project specific report (Bengston 2007) which indicates there are at least 64 potential areas of cultural and/or geographical interest within the general vicinity of the EEC project area (Bengston 2007). Twenty of the areas involve subsistence activities. Twenty contain village or other habitation sites, six areas have the potential for burial sites, and there are three trails and a landmark associated with one of the trails. There are seven battle or massacre sites. There are six places where fandangos or festivals were held, as well as one area that was used as a gathering place for Southern Paiute bands. Of particular importance are five places associated with traditional stories, eight places associated with various ceremonial and ritual practices, and one power place. In addition to these places, Woods (2003) identified nine areas that were simply documented as areas of cultural concern, but with no other information. Often these places have only been associated with a general location.

An additional ethnographic study is in the process of being conducted for the project components within a portion of the BLM Elko District since there is a paucity of ethnographic data for this area. On May 5, 2008, a letter was sent to several tribes requesting their participation in the ethnographic study (**Table 3.11-3**). On July 15, 2008, a field review of project components with interested tribes was conducted. As tribes continue to respond and the study progresses, the data will be included in the analysis.

TABLE 3.11-3. TRIBES CONTACTED FOR BLM ELKO DISTRICT ETHNOGRAPHIC STUDY

TRIBE	RESPONSE	STATUS
Confederated Bands of Goshute Tribe	Yes	Participant
Elko Band		
Battle Mountain Band		
South Fork Band		
Wells Band	Yes	Participant
Te-Moak		
Ely Shoshone	Yes	Participant
Duckwater Shoshone Tribe	Yes	Participant
Duck Valley Shoshone-Paiute Tribes		
Yomba Shoshone		

Indian Trust Resources are natural resources, either on or off Indian lands, that are retained by, or reserved by or for Indian tribes through treaties, statutes, judicial decisions, and executive orders, which are protected by a fiduciary obligation on the part of the United States. Indian trust resources located on Indian reservation lands are managed and protected by the tribes. Indian trust resources located on lands administered by the BLM are managed and protected by the BLM; no Indian trust resources have been identified on BLM-administered lands within the project area. However, four parcels of land were recently transferred to be held in trust for the Ely Shoshone Tribe for traditional, ceremonial, commercial, and residential purposes (BLM 2008b). Two of the parcels are adjacent to the proposed South Plant worker village.

Cultural resource sites are manifestations of past human activities. Prehistoric and ethnographic overviews are provided in **Section 3.10** (Cultural Resources), as are the known cultural resource sites in the project area. The prehistoric and historic sites indicate continuous use of the area for thousands of years by various groups.

3.11.4 Specific Project Area Conditions

3.11.4.1 Plant Sites

South Plant Site

One place of potential cultural and/or geographic interest to the Tribes within Steptoe Valley is located a few miles northwest of the proposed South Plant Site and west of the associated worker village. The worker village is adjacent to the lands proposed to be transferred into trust for the Ely Shoshone Tribe. No known places of cultural and/or geographic interest to the Tribes within Steptoe Valley are located near the associated Mt. Wheeler Transmission Line.

North Plant Site

No known places of cultural and/or geographic interest to the Tribes within Steptoe Valley are located near the proposed North Plant Site or its associated worker village. No known places of cultural and/or geographic interest to the Tribes within Steptoe Valley are located near the associated Mt. Wheeler Transmission Line.

3.11.4.2 Electric Transmission Facilities

Table 3.11-4 summarizes the known places of potential cultural and/or geographic interest to the Tribes (Bengston 2007) located within or near the electrical transmission components of the project.

TABLE 3.11-4. KNOWN NATIVE AMERICAN PLACES OF INTEREST IN PROXIMITY TO ELECTRIC TRANSMISSION FACILITIES

ELECTRICAL TRANSMISSION COMPONENT	KNOWN PLACES OF INTEREST*	OTHER DATA
Segment 1A	0	
Segment 1B	0	Four sites are located several miles to the west along the Egan Range.
Segment 1C	1	One site appears to be within corridor. Another geographic place of interest is located just to the east.
Segment 1D	0	
Segment 1E	0	
Segment 1G	0	
Segment 3	1	One place located near south end of segment.
Segment 5A	1	One place located just to the northeast of this segment.
Segment 6A	0	
Segment 6C	1	One place appears to be within corridor. An additional three known sites are located possibly near or adjacent to this segment.
Segment 8	0	
Segment 9A	1	Black Canyon Petroglyphs (Rock Art) nearby
Segment 9B	1	One place appears to be located within corridor.
Segment 9C	0	
Segment 9D	[illegible]	One place adjacent or within corridor, another (Black Canyon Petroglyphs) to the west.
Segment 10	1	One place located near corridor to the east
Segment 11	1	One place to the west of corridor
Robinson Summit Substation	0	
Harry Allen Substation	0	

*Exact locations of places of interest may not be known, therefore this information is approximate.

3.11.4.3 Water Supply Facilities

Table 3.11-5 summarizes the known places of potential cultural and/or geographic interest to the Tribes (Bengston 2007) located within or near the water supply components of the project.

TABLE 3.11-5. KNOWN NATIVE AMERICAN PLACES OF INTEREST IN PROXIMITY TO WATER SUPPLY FACILITIES

WATER SUPPLY COMPONENT	KNOWN PLACES OF INTEREST*	OTHER DATA
Lages Station Well Field	0	
Coyote Valley Ranch Well Field	0	This well field is adjacent to the lands proposed to be transferred into trust for the Ely Shoshone Tribe.
North Well Field	0	
Middle Well Field	0	
South Well Field	0	
Limited South Well Field	0	
Duck Creek Waterline	0	
Lages Station Waterline	0	

*Exact locations of places of interest may not be known, therefore this information is approximate.

3.11.4.4 Rail Facilities

Alternative Rail Line

No known places of potential cultural and/or geographic interest to the Tribes within Steptoe Valley are located within or near the Alternative Rail Line. The majority of this alternative would extend through BLM Elko District lands; the Wells Band has expressed concern for potential impacts to woodland resources and access within the BLM Elko District.

South Plant Site Rail Lead

No known places of potential cultural and/or geographic interest to Indian tribes are located near the South Plant Site Rail Lead.

North Plant Site Rail Lead

No known places of potential cultural and/or geographic interest to Indian tribes are located near the North Plant Site Rail Lead.

3.12 Land Use and Realty

3.12.1 Area of Analysis

The direct effects area of analysis occurs within the proposed disposal area for the plant sites and ROWs for the project. However, land use issues are best understood when related to the larger sociopolitical setting that provides needed context to determine impact significance. For purposes of analysis, land use, ownership, and access will be examined at the county level and within BLM District Offices.

3.12.2 Data Sources and Methods

Land use information, policies, and current management practices were gleaned from public sources, specifically from BLM resource management plans (RMPs) for the Elko, Ely, and Southern Nevada Districts; and from county land use plans. Land use authorizations and land tenure information were gathered from BLM RMPs as well as current data contained within BLM's Legacy Rehost 2000 System (LR2000) that provides reports on BLM land and mineral

use authorizations for oil, gas, and geothermal leasing, ROWs, coal and other mineral development, land and mineral title, mining claims, withdrawals, classifications, and federal mineral estate information. These data were used to characterize land use within and surrounding the project area for the purpose of determining potential changes in public and private land use and ownership, BLM land use authorizations, and land disposals.

3.12.3 Existing Conditions

The major components of the proposed project (i.e., plant sites, water supply facilities, railway corridor, two substations, and transmission line corridors) would occur primarily in Steptoe Valley in White Pine County. A portion of the railway corridor would extend north into Elko County. The transmission lines would extend south into Nye, Lincoln, and Clark Counties. Therefore, project components would be subject to the various county land use plans and ordinances. Further, project components cross private, state, and federal lands. The federal lands involved are almost entirely public lands administered by the BLM; project components would be subject to the appropriate district office RMP. Three BLM district offices administer the proposed project lands (Ely, Elko, and Southern Nevada). This section will discuss four major components of land use:

- Current land use plans and policies
- Land use and ownership
- Land use authorizations
- Land tenure program

The first two will be discussed in general terms as they apply to the project area as a whole. The remaining two land use components will be discussed as they relate to specific project elements.

3.12.3.1 Land Use Plans and Policies

BLM Land Use Plans

Wells RMP

The RMP for the Wells Resource Area within the Elko District (BLM 1985) encompasses approximately 4.3 million acres of public land in the eastern half of Elko County. The RMP indicates that demand for disposal and exchange of public lands is relatively high in the area. Land ownership at the time consisted of a checkerboard pattern that naturally led to many inholdings. Major land actions in the Wells Recreation Area consisted primarily of Recreation and Public Purposes Act leases and sales (BLM 1985).

Ely RMP

The BLM finalized a new RMP for the Ely District in November 2007. The planning area encompasses a total of 13.9 million acres within the planning area boundary, of which the BLM administers approximately 11.5 million acres in Lincoln, White Pine, and portions of Nye counties in Nevada. The new RMP replaces the Egan Resource Area RMP, the Caliente and Schell Management Framework Plans (MFPs), and incorporates relevant sections from the Caliente Management Framework Plan (MFP) Amendment. The RMP provides programmatic and implementable direction for management of BLM administered public lands within the Ely RMP planning area. The RMP provides direction in resource management activities including leasing minerals such as oil and gas; construction of electrical transmission lines, pipelines, and roads; grazing management, recreation and outfitting; preserving and restoring wildlife habitat;

selling or exchanging lands for the benefit of local communities; military use of the planning area; and conducting other activities that require land use planning decisions.

Las Vegas RMP

The Las Vegas RMP (BLM 1998a) establishes land use objectives and management actions for 3.3 million acres of land in Clark and Nye Counties, Nevada. The Southern Nevada District Office administers approximately 67 percent of Clark County and 6 percent of Nye County. The RMP acknowledges the interconnection of the Harry Allen Substation to a proposed 500-kV line within the SWIP Corridor (BLM 1998a).

County Land Use Plans

Elko County

There is no comprehensive or land use plan for Elko County.

White Pine County

The White Pine County Land Use Plan describes land use issues in the County, as well as in the specific planning areas of Ely, Baker, Lund, McGill, Preston, Ruth, and the Ely-McGill corridor. The plan also provides a number of land use goals and implementation strategies; however, it contains no goals or strategies related specifically to utilities or utility corridors, other than a provision for the efficient use of community infrastructure. White Pine County has 11 general land use designations. Most land outside of established communities is designated as open range or federal reserve. The proposed project area lies predominantly within these two land use designations (White Pine County 1998).

The White Pine County Public Land Use Plan provides a coordinated land use planning effort among the County, BLM, and Forest Service and is included as an appendix to the White Pine County Land Use Plan. In general, the public land policies encourage mineral exploration, opportunities for livestock grazing, and other agricultural uses; encourage dispersed recreational opportunities; and support a diversity of wildlife species and habitats. Related to access and transportation, the plan encourages route locations for transportation, utilities, and communication corridors to be planned in harmony with other resources on public lands (White Pine County 1998).

Nye County

The Nye County Comprehensive Plan (1994) acknowledges that it is the third largest county in the continental U.S. in terms of land area (approximately 11.5 million acres). Of this, 7 percent is private land. The County has adopted the Uniform Building Code, but does not have a zoning ordinance. The County's far-flung communities are very diverse and the County encourages them to develop specific area plans that suit their individual needs for growth and development. Outside of Pahrump, no regional land use plans were found (Nye County 1994).

Lincoln County

There are 11 land use designations shown on the land use map for Lincoln County. The residential land use designation is divided into rural, low, medium, and high-density developments. Rural and lower density development areas are those that should be located away from public utilities. The plan encourages new industrial development along the highway and railway corridors in the county where possible. The plan also favors the disposition of federal lands into private ownership (Lincoln County 2006).

Clark County

The land use component of the Clark County Comprehensive Plan breaks the county into planning areas. The Northeast Planning Area pertains directly to the project elements that would occur within the county. The Northeast Planning Area has the most acres within the county dedicated to office and industrial land uses (10,166 acres), and contains the most open space (7,284 acres) (Clark County 2007a).

3.12.3.2 Land Use and Ownership

Land Use

Within the project area there are agricultural and range lands, sage scrub and grasslands, forested mountains, and desert valleys. Existing land uses include farms and ranches, rural residences, grazing allotments, range improvements, mines/mining claims, energy and communication facilities, transportation systems, developed recreation areas, and dispersed recreation areas.

The dominant land use is livestock grazing/ranching. The majority of public lands in Nevada are managed by the BLM for range uses. Associated range improvements include fences, wells, water tanks, corrals, and windmills. The BLM has divided range lands in the region into grazing allotments to facilitate the management of the land for public livestock grazing (see **Section 3.10).** Much of the private and state lands are also open range.

Agricultural lands in Nevada are sparse and dispersed, typically located near perennial streams and rivers. There are no prime farmlands within the project area (see **Section 3.5.3.2**).

Mining is an important land use in Nevada. There are numerous mining claims in the vicinity of the Project (see **Section 3.3**). There are active mines in the foothills of the Schell Creek Range at the edge of Steptoe Valley. The Robinson Project, formerly the Kennecott copper mine, is a large, active mine west of Ely.

Land Ownership

The counties are contiguous. Elko County is bordered on the north by Idaho and Utah to the east. On the west and southwest, Elko County is bordered by Humboldt, Lander, and Eureka Counties. White Pine County is bordered on the east by Utah and by Eureka and Nye Counties on the west and southwest. Nye County is bordered by Lander, Eureka, White Pine, Lincoln, and Clark Counties to the north and east; and bordered by Churchill, Mineral, and Esmeralda Counties, and California to the west. Lincoln County is bordered on the east by Utah and Arizona, on the west by Nye County, and on the south by Clark County. Clark County is located in the southern reaches of Nevada, and is bordered by Lincoln County to the north, Utah and Arizona on the east, and Nye County and California to the west. The federal government is a significant landowner in each of the three counties (**Table 3.12-1**). Lincoln, Nye, and White Pine Counties are over 90 percent federal land.

TABLE 3.12-1. LANDOWNERS AND ACRES OWNED BY COUNTY

DESCRIPTION	ELKO	WHITE PINE	NYE	LINCOLN	CLARK
Total Acres	10,995,840	5,699,000	11,560,960	6,816,000	5,173,760
Federal	71.5%	93.5%	92.7%	98.3%	89.1%
Tribal	1.5%	1.2%	0.1%	0.0%	1.5%
State	0.2%	0.2%	0.2%	0.3%	1.2%
Local/Private	26.8%	5.1%	7.1%	1.4%	8.1%

Source: University of Nevada Cooperative Extension, Public Lands in the State of Nevada: An Overview (2007).

Elko County has the highest percentage of privately-owned land of the five counties as a result of lands transferred to the Central Pacific Railroad during construction of the transcontinental railroad during the 1870s. White Pine County contains 14 percent of the area of the five counties, and 93.5 percent of the land in White Pine County is controlled by the federal government (see **Figures 3.12-1a – 3.12-1c**).

3.12.4 Specific Project Area Conditions

3.12.4.1 Plant Sites

BLM Land Use Authorizations

Of the six airports in White Pine County, there is one airport lease on BLM land for the Long Now Foundation landing strip in Spring Valley east of Ely. The FAA manages the airspace in the vicinity of all registered air facilities (e.g., airports, registered air strips) to control potential obstructions to aircraft operations.

There are 36 communication sites on the Ely District. Those closest to the South and North Plant Sites include the Cherry Creek, Duck Creek, Squaw Peak, Kimberly Peak, and Saxton Peak communication sites.

ROWs in and around the South and North Plant Sites have been issued for roads, power lines, fiber optic lines, state highway material sites, U.S. highways, water pipelines, irrigation ditches, and other purposes.

Two existing major electric transmission line corridors in the project area include the Southwest Intertie Project (SWIP) corridor and the Falcon to Gonder corridor. The SWIP Corridor varies in width from 1/2- to ¾-mile wide, and runs from Idaho south to the Harry Allen Substation in Clark County, Nevada. Currently. The Falcon to Gonder corridor contains a 180 mile long 345-kV electric transmission line connecting the Falcon substation north of Dunphy, Nevada with the Gonder Substation north of Ely. This ROW is currently 160 feet wide. The Falcon to Gonder corridor also contains a parallel 230-kV line from the Gonder Substation 67 miles west to the Machacek Substation near Eureka, Nevada. West of Eureka the 230-kV line continues another 184 miles separated from the 345-kV line to a Sierra Pacific Power Company electric power plant located near Yerington, Nevada. Additional transmission line corridors contain two 230-kV lines and extend east from the Gonder Substation towards Utah traversing the eastern edge of Steptoe Valley and the Schell Creek Range.

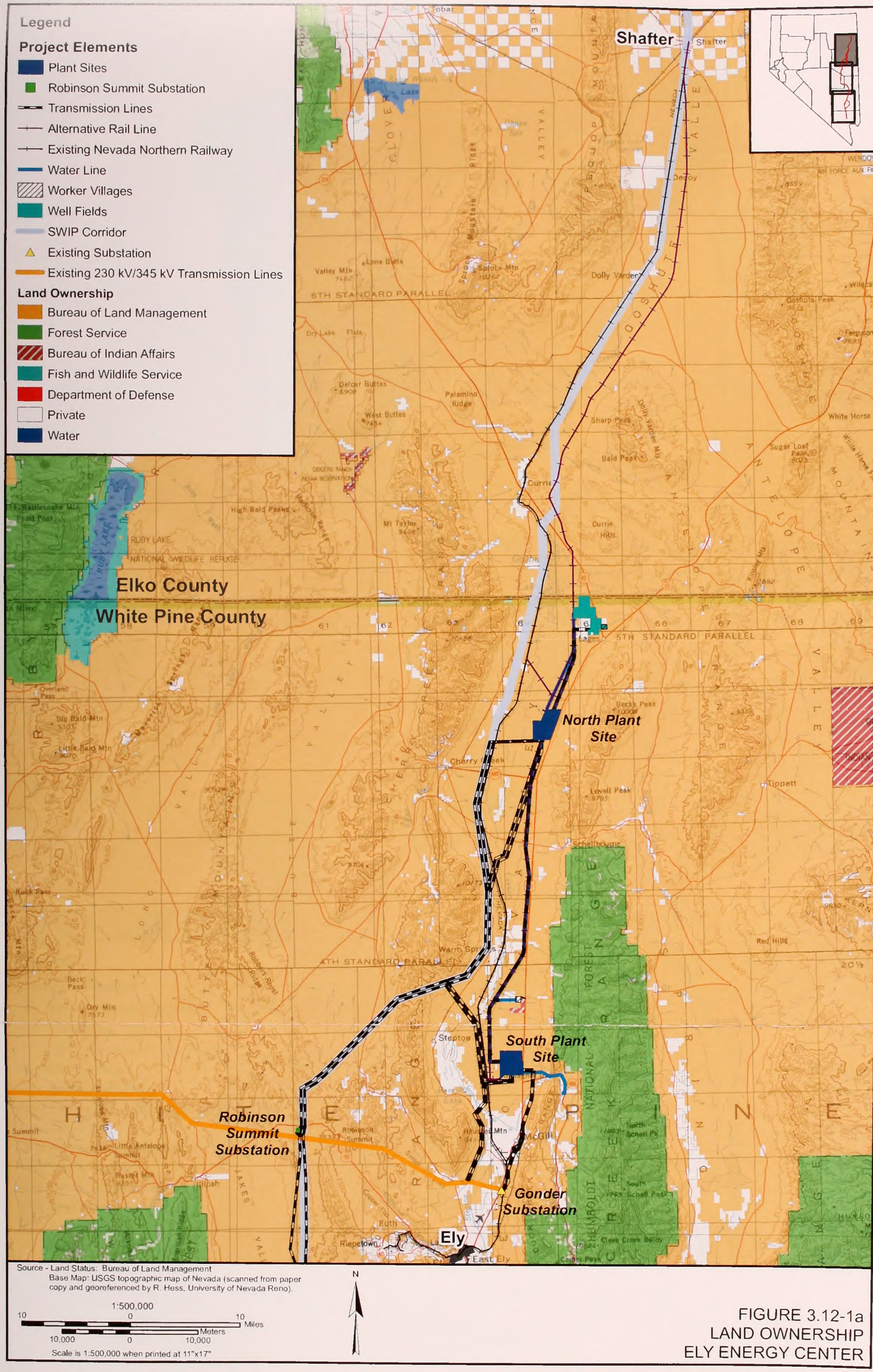
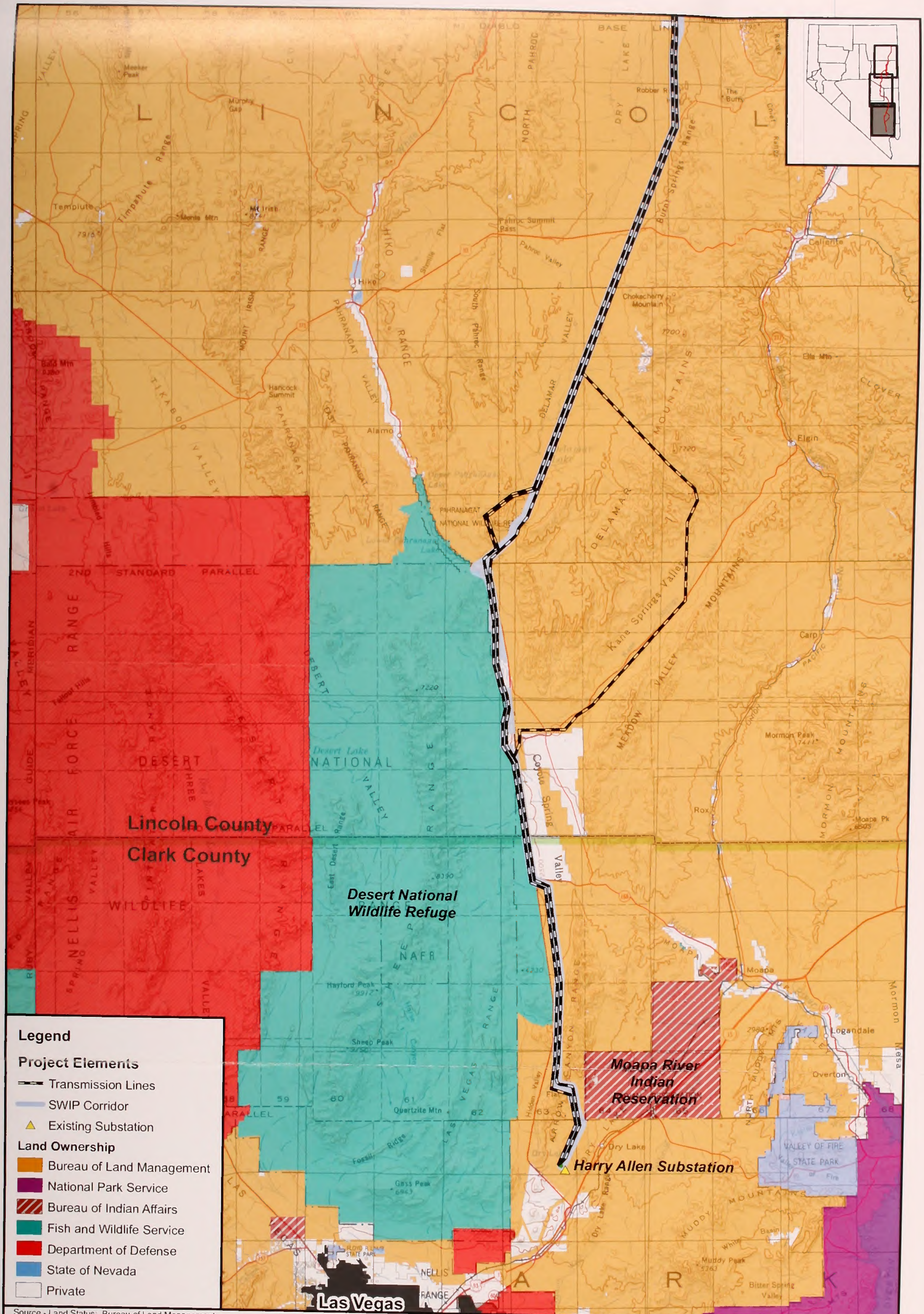


FIGURE 3.12-1a
LAND OWNERSHIP
ELY ENERGY CENTER

FIGURE 3.12-1b
LAND OWNERSHIP
ELY ENERGY CENTER



Source - Land Status: Bureau of Land Management
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno).

1:500,000

10 0 10 Miles

10,000 0 10,000 Meters

Scale is 1:500,000 when printed at 11"x17"

FIGURE 3.12-1c
LAND OWNERSHIP
ELY ENERGY CENTER

Two existing parallel 69-kV transmission lines owned by Mt. Wheeler Power would be upgraded from the Gonder Substation north to McGill. One of these existing lines that continues north to Lages Station would be upgraded to a proposed substation location, north of Duck Creek Road. These upgrades (plus a proposed brand new line) would be needed in order to facilitate EEC plant construction and provide power for the worker village and well fields. The existing ROW for the Mt. Wheeler Transmission Lines originates at the Gonder Substation and runs along the east side of US-93, north to the Lages Station area. The existing ROW is 40 feet wide. Approximately 9 miles (43.6 acres) are located on BLM land up to the proposed substation location and the remaining 3.2 miles (15.5 acres) of the lines to be upgraded are located on privately owned or City of McGill property.

Other existing linear facilities not within the electric transmission line corridors include a 230-kV line from Gonder Substation to the mine at Ruth, Nevada, a 69-kV transmission line that crosses the toe of the Schell Creek Range between Ely and Lages Station, and a 69-kV transmission line from the southern end of Dry Lake Valley that traverses the toe of Burnt Springs Range from Black Canyon south into Delamar Valley and then parallel to Highway 93 and the Pahranagat Wash.

Land Tenure

The Ely District Office RMP/FEIS (BLM 2008a) indicates that there are 18,543 acres of public land remaining for disposal in White Pine County. The lands identified for disposal that occur in Steptoe Valley near the South and North Plant Sites include approximately 5,984 acres located in T.20N., R.64E., Sections 28, 29, 32, 33; T.21N., R.64E., Sections 5, 6; and T.22N., R.64E., Sections 29, 30, 31, 32.

The White Pine County Conservation, Recreation, and Development Act of 2006 allows up to 45,000 acres of BLM lands to be made available for disposal through a joint selection process between the county and the BLM. The Ely RMP also allows for the disposal of 4,500 acres of public land by direct sale for power production. The BLM Ely District Office RMP provides management guidance for this authorized land disposal. A small portion of this total acreage will be available for sale each year over a period of several years.

Acquisitions of non-federal lands within Ely District have been limited to three easements for a cattle guard, a fence in Duck Creek, and a spring development.

There is one proposed withdrawal in the vicinity of the project area. The Murry Springs Watershed Protection withdrawal would be for approximately 2,450 acres and constitutes the water supply for Ely.

Construction of the South Plant Site and its facilities would require the development of an associated worker village (not including access roads), which would be located on privately owned land just west of US-93. Construction of the North Plant Site and its facilities would require the development of an associated worker village, which would be also located on privately owned property, northwest of the US-93 and US-93A junction.

3.12.4.2 Electric Transmission Facilities

BLM Land Use Authorizations

Land use authorizations in the vicinity of the proposed 500-kV transmission lines include various leases and ROWs in the Ely and Southern Nevada Districts. The Alamo Airport located west of Alamo, Nevada is located to the west of the proposed 500-kV lines in Lincoln County. The communication sites closest to the 500-kV lines would include Highland Peak, Chokecherry, Delamar Mountain, and Kane Springs.

Land Tenure

There are no public lands on the Ely District identified for current disposal that are in the vicinity of the proposed 500-kV transmission lines. There are some lands that were transferred to the USFWS as a part of the Lincoln County Conservation, Recreation and Development Act of 2004. These lands were located just north of the Desert National Wildlife Refuge.

Legislation over the years has provided for the disposal of public lands in Clark County for various uses including recreation and industrial use. For example, the Southern Nevada Public Land Management Act (SNPLMA) of 1998 allows the BLM to sell public land within a specific boundary around Las Vegas, Nevada. A key provision of the law is that money generated by these land sales remains in Nevada. The money provides funding for a variety of land management activities emphasizing recreation sites.

3.12.4.3 Water Supply Facilities

The BLM land use authorizations and land tenure issues would be the same as those presented for the proposed plant sites in Steptoe Valley (**Section 3.12.4.1**).

3.12.4.4 Rail Facilities

The BLM land use authorizations and land tenure issues for the Alternative Rail Line, sidings, and rail leads would be the same as those presented for the proposed plant sites in Steptoe Valley (**Section 3.12.4.1**).

3.13 Special Designations

This section describes resources comprising Wilderness Areas, Wilderness Study Areas, Areas of Critical Environmental Concern, Research Natural Areas, Geologic Areas, National Parks, National Historic Trails, NDOW Management Areas, and National Wildlife Refuges in the direct and indirect effects area being analyzed for the proposed EEC and associated project elements. Lands outside of BLM jurisdiction were identified and included in the analysis if they were within the 50 km project area because recognized natural resources are present on these lands and potential impacts from the project could affect these Special Designation Areas (SDAs). Included are lands administered by the National Park Service, USFS, National Wildlife Refuge, and Nevada Department of Wildlife Conservation lands. Other Nevada state lands, such as state parks, were not included: these are covered under Recreation Resources.

Nationally, there are several federal designations that are used to protect wildlands, wildlife, and unique natural features:

- Wilderness Areas (WAs) are designated by Congress under the authority of The Wilderness Act of 1964 (P.L. 88-577; 16 USC 1131-1136) and comprise the National Wilderness Preservation System. Wilderness is defined as an area where "....the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Wilderness designation is meant to ensure that the land is preserved and protected in its natural condition (BLM Undated.a). There are 76 Wilderness Areas in the three BLM District Offices affected by the EEC (BLM Undated.b). The BLM manages WAs as VRM Class I.
- Wilderness Study Areas (WSAs) are areas that has been inventoried for Wilderness designation as described in the Federal Land Policy and Management Act (FLPMA), but Congress has not yet considered them for designation. These areas are managed to retain their wilderness attributes until Congress determines whether or not they should

be designated (BLM 2006; BLM Undated.a). There are 18 WSAs in the three BLM District Offices impacted by the proposed EEC (BLM Undated.c).

- Areas of Critical Environmental Concern (ACEC) are the principal BLM designation for public lands where special management is required to protect important natural, cultural, and scenic resources, or to identify natural hazards (BLM 2007e p.G2, BLM Undated.a). In proximity to the EEC electric transmission facilities are four ACECs that are designated to protect fragile desert flora and fauna such as the desert tortoise, a federally listed threatened species.
- Research Natural Areas (RNAs) are federal agency-designated areas protected and maintained in natural conditions for the purpose of conserving biological diversity, conducting environmental research, and fostering education. The system was established in 1927. Several federal land management agencies oversee RNAs. The Forest Service manages the four RNAs identified in this EIS (BLM Undated.a).
- Geologic Areas are designated by the BLM because they have unique or outstanding geologic importance that requires special management and attention to ensure preservation of the resources. There are two Geologic Areas identified within 50 miles of one or more elements of the EEC (BLM 2008a, pg. 3.22.2).
- The National Park System was formed by President Woodrow Wilson with the 1916 National Park Service Organic Act. National Park and other lands held by the National Park Service are managed to "preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations." The Park Service cooperates with partners to conduct research, support recreation and education, and extend the benefits of natural and cultural resources within NPS lands to people in the US and the world. There are 391 units in the NPS covering 84 million acres in the US and US territories and protectorates. There are several different land designations within the NPS including National Parks, National Monuments, National Trails, National Recreation Areas, National Lakeshores, and several others. Within the direct and indirect effects area of the EEC there are two National Parks (Great Basin and Zion), one National Recreation Area (Lake Mead), and one National Historic Trail (Pony Express National Historic Trail, also listed below) (NPS 2007a).
- National Historic Trails commemorate historic routes, such as the Pony Express and California Trails, and promotes their preservation, interpretation and appreciation. The National Trails System Act (Public Law 90-543) was passed by Congress in 1968. The Pony Express National Historic Trail was established in 1992 and follows the 1,622 mile Pony Express route, which passes through the Schell Creek and Cherry Creek Ranges and Steptoe Valley as it crosses Central Nevada, all of which are within the direct or indirect effects area of this EIS (NPS 2007b; BLM 2007e; and BLM Undated.a).
- National Wildlife Refuges (NWR) are lands owned by the federal government and managed by the USFWS to conserve, protect, and enhance the nation's fish and wildlife and their habitats for continuing benefit of people (USFWS 2007e). The Desert National Wildlife Refuge (DNWR) is adjacent to the SWIP corridor near the south terminus.
- The State of Nevada also protects wildlife, wildlands, and plants. The NDOW maintains several Wildlife Management Areas (WMAs), which are state owned or leased lands that are managed to protect wetlands and waterfowl. The public can use these areas as

public hunting grounds for migratory game birds, upland game birds, furbearers, and big game (NDOW 2005).

3.13.1 Area of Analysis

The area of analysis includes all special designation resources that would be directly affected by or would be within a 50-mile radius of the Project elements and Alternatives discussed in **Chapter 2**. The approximate distance and general direction from the Special Designation Area (SDA) is noted in **Table 3.13-1**.

3.13.2 Data Sources and Methods

The following indicators were considered when describing the affected environment for special designations:

- Acres of disturbance (temporary and permanent).
- Change in quality of primitive wilderness experience relative to outside influences.

3.13.3 Existing Conditions

Eight SDAs are within or immediately adjacent to one or more of the components of the proposed EEC Project. Many more are within 50 miles of one or more EEC elements. The project area includes 33 WAs, 5 WSAs, 9 ACECs, 2 National Parks, 1 National Recreation Area, 7 federal or state wildlife areas, 6 RNAs, 1 geologic area, and 1 National Historic Trail. These SDAs are listed in **Table 3.13-1** in alphabetical order. Each SDA is also discussed in the text below the table, grouped by the EEC element(s) that are nearest to it: power plant sites, electric transmission facilities, water supply facilities, and rail facilities. This section provides a brief synopsis of each SDA as well. **Figure 3.13-1** shows the locations of these SDAs relative to EEC elements.

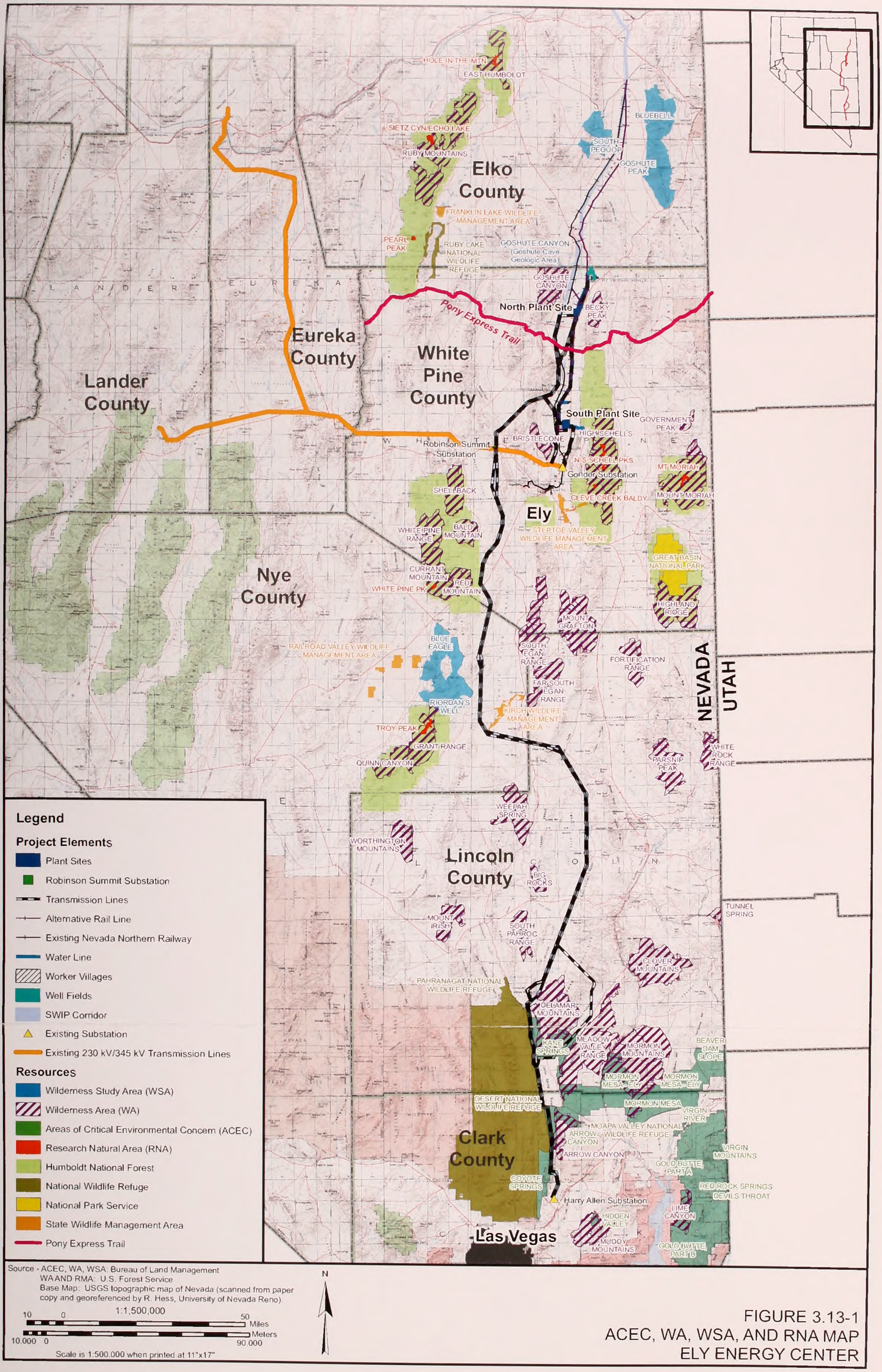


FIGURE 3.13-1
ACEC, WA, WSA, AND RNA MAP
ELY ENERGY CENTER

TABLE 3.13-1. SPECIAL DESIGNATIONS AREAS GROUPED ALPHABETICALLY

SPECIAL DESIGNATION AREA ^	SIZE OF AREA IN ACRES	GEOGRAPHIC LOCATION OF AREA	APPROXIMATE LINEAR DISTANCE FROM THE EEC ELEMENT
Arrow Canyon ACEC	1,977	Due E of Desert NWR	- Adjoins ETF Segment 11 for 10 mi.
Arrow Canyon WA	27,530	2 mi. E of Desert NWR and surrounded on W, N, and E sides by Mormon Mesa/Arrow Canyon ACEC	- 2.0 mi. E of ETF Segment 11
Bald Mountain WA	22,366	E side of White Pine Mts.	- 5.5 mi. W of ETF Segment 6C
Beaver Dam Slope ACEC	36,900	E of Desert NWR: Runs E of Mormon Mesa ACEC to Utah border	- 40 mi. E. of ETF Segment 11
Becky Peak WA	18,119	N end Shell Creek Range	- 2.0 mi. E of North Plant Site - 3.0 mi. S of North Plant Site Worker Village - 3.0 mi. E of proposed rail and pipeline routes - 3.0 mi. E of North Well Field - 6.0 mi. NE of Middle Well Field - 3.0 mi. E of N. terminus of ETF
Big Rocks WA	12,997	North Pahroc Range, N of US-93 and Pahroc Summit	- 10 mi. W of ETF Segment 8
Blue Eagle WSA	14,300	N ½ Grant Range, W side, S of US Rte. 6	- 6.0 mi. W of ETF Segment 6C
Bluebell WSA	55,665	Toano Range, N end Goshute Mts.	- 5.0 mi E of Alternative Rail Line
Bristlecone WA	14,095	N end Egan Range, by Heusser Mt., just W of McGill	- 4.75 mi. SW of South Plant Site - 9.5 mi. SW of South Worker Village - 5.5 mi. W of rail lead to South Plant Site - 0.75 mi W of ETF Segment 3 - 4.25 mi. SE of ETF Segment 4A and 1D - 6.0 mi. SW of South/Limited South Well Field and pipeline - 7 mi. SW of Duck Creek Pipeline Alt.
Cleve Creek Baldy RNA	Unknown	Within High Schells WA	- 13.5 mi. SE of South Plant Site - 13.5 mi. SE of South Worker Village - 13.5 mi. SE of ETF Segment 4A - 10 mi. E of ETF Segment 3 - 13.5 mi. E of proposed RR line and pipeline ROW - 13.5 mi. E of South Well Field Alt.
Clover Mountains WA	85,748	12 mi. S of Caliente, NV	- 10.0 mi. E of ETF Segment 10
Coyote Springs ACEC	75,000	E of the SE corner of DNWR	- ETF Segment 11 passes through ACEC for 18.0 miles
Currant Mountain WA	47,357	SW side Currant, or White Pine, Mts.	- 8.0 mi. W of ETF Segment 6C
Delamar Mountains WA	11,328	E of the NE corner of DNWR	- ETF Segment 9C and 9D occur adjacent to this WA. - Segment 10 passes to E of WA by 1.0 mi.
Desert National Wildlife Refuge (DNWR)	1.6 million	N of Las Vegas, W. of US-93	- ETF Segment 9 is immediately east of the DNWR boundary for approx. 30 mi. - Approximately 2/3 of eastern border of DNWR is within 5 mi. of Seg 11 of ETF
East Humboldts WA	36,670	N end East Humboldt Range	- 45 mi. W of Shafter

SPECIAL DESIGNATION AREA ^	SIZE OF AREA IN ACRES	GEOGRAPHIC LOCATION OF AREA	APPROXIMATE LINEAR DISTANCE FROM THE EEC ELEMENT
Far South Egans WA	36,384	Southern tip Egan Range	- 12.0 mi. N E of ETF Segment 6C - 10.0 mi. N of ETF Segment 8
Fortification Range WA	30,656	S of Gt. Basin NP, between US-93 and County Rd 47	- 45 mi. east of ETF Segment 6C
Franklin Lake WMA	Apprx. 2,400	N of Ruby Lake NWR	- 36 mi. W of existing RR
Gold Butte A & B ACECs	1,480	On Utah border east of the S end of the ETF	- 35 mi. E of ETF Segment 11
Goshute Canyon WA	42,544	Cherry Creek Range	- 5.5 mi. W of North Plant Site - 5.0 mi. W of North Worker Village - 5.0 mi. W of Alternative Rail line - 6.0 mi. WNW of North Well Field - 11.0 mi. NW of Middle Well Field - 2.5 mi. W of N. terminus of ETF and Segments 1A and 1B
Goshute Cave Geologic Area	120	Within Goshute Canyon WA	- 5.5 mi. W of North Plant Site - 5.0 mi. W of North Worker Village - 5.0 mi. W of Alternative Rail line - 2.5 mi. W of N. terminus of ETF and Segments 1A and 1B
Goshute Peak WSA	61,004	Toano Range, Goshute Mts.	- 6.5 mi. E of Alternative Rail line
Government Peak WA	6,313	N end of Snake Range, N of Mt. Moriah WA	- 32.0 mi. E of South Plant Site - 37.0 mi. SE of North Plant Site
Grant Range WA	52,600	S ½ Grant Range, S of Riordan's Well WSA, S of US-6	- 10.0 mi. WSW of ETF Segment 6C
Great Basin National Park	80,000	W of Baker, NV, and S of Mt. Moriah WA	- 40 mi. SE. of South Plant Site - 48 mi. E of ETF 6C
Hidden Valley ACEC	3,520	At N end of Muddy Mts. WA	- 11 mi. SE of ETF terminus at Harry Allen Substation
High Schells WA	121,497	E of McGill and Ely	- 5.0 mi. E of South Plant Site - 5.0 mi. E of South Worker Village - 6.0 mi. E of ETF Segment 4A - 5.0 mi. E of ETF Segment 3 - 6.0 mi. E of new RR & pipeline ROW - 6.0 mi. E of South Well Field - 11.0 mi. SE of Middle Well Field
Highland Ridge WA	68,627	Adjacent to S end of Great Basin NP	- 43 mi. E of ETF Segment 6C
Hole-in-the-Mountain RNA	1676 acres	Highest elevations of E. Humboldt Range	- 50 mi. W of Shafter
Kane Springs ACEC	65,900	E of DNWR, S of Delamar Mt. WA	- ETF Segment 9D passes through NW finger of ACEC for 6.75 mi. - ETF Segment 10 passes through main Kane Springs Valley for 12.75 mi. - US-93 and ETF Segment 9 follow a similar corridor within NW finger of ACEC. Southern portion of Seg, 10 also crosses through this ACEC.
Kirch WMA	14,815	White River Valley, E of Grant Range	- ETF Segment 6C is adjacent to south end of WMA for approx. 1,320 ft. - Most of WMA is N. of this contact point.
Lake Mead NRA	1.5 million	Lake Mead	50 mi. from EFT terminus at Harry Allen Substation

SPECIAL DESIGNATION AREA ^	SIZE OF AREA IN ACRES	GEOGRAPHIC LOCATION OF AREA	APPROXIMATE LINEAR DISTANCE FROM THE EEC ELEMENT
Lime Canyon WA	23,233	Adjoining Lake Mead NRA	- 50 mi. from EFT terminus at Harry Allen Substation
Meadow Valley Range WA	123,488	E of DNWR in Meadow Valley Mts.	- 0.5 mi. SE of ETF Segment 10
Moapa Valley NWR	106	3 mi. due N of Moapa Indian Reservation	- 14 mi. E of ETF Segment 11
Mormon Mesa ACEC	150,734	E of Desert NWR	- 1.25 mi E of ETF Segment 11
Mormon Mts. WA	157,938	East of Meadow Valley Range WA	- 10.0 mi. ESE of ETF Segment 10
Mt. Moriah RNA	876 acres	In Moriah WA, N of Great Basin National Park	- 26 to 32 mi. E of ETF Segment 3
Mt. Grafton WA	78,743	Schell Ck Range W of Geyser Ranch	- 40 mi. E of ETF Segment 6C
Mt Irish WA	28,334	S of Worthington	- Approximately 10 mi. west of ETF Segment 9A
Mt. Moriah RNA	876	Within Mt Moriah WA	- 35 mi. E of ETF Segment 3
Mt. Moriah WA	89,790	N end of Snake Range, which includes Great Basin National Park	- 32 mi. E of ETF Segment 3 - 26 mi. E of South Plant Site
Muddy Mountains WA	48,019	Muddy Mts. East of Las Vegas	- 10 mi. SE of ETF terminus at Harry Allen Substation, 10 mi. E of Las Vegas
North-South Schells RNA	4,021	In Schell Creek Range, 19 mi. NE of Ely	- 12.0 mi. E of South Plant Site
Pahranagat NWR	~ 5380	About 22 mi. S of Hiko, on N end of DNWR	- Intersects ETF Segment 9D at the S end of the refuge
Palisade Mesa WSA	99,500	S end Pancake Range	- 48 mi. W of ETF Segment 6C
Parsnip Peak	43,693	Wilson Ck Mountains	-25 mi. E of ETF Segment 8
Pearl Peak RNA	665	In Ruby Mts., S end	- 45 mi. W of RR - 48 mi. WNW of North Plant Site
Pony Express National Historic Trail	1,622 mi. total	E of Schellbourne Pass, 22 mi. N of McGill	- Intersected by ETF Segment 1B and 1A; proposed RR line; proposed waterline, and Middle Well field Alt. - Trail crosses Steptoe Valley between Schellbourne Pass in Schell Ck Range and Egan Pass in Cherry Ck Range
Quinn Canyon WA	26,310	SW side of Grant Mts.	-14 mi. SW of ETF Segment 10
Railroad Valley WMA	14,720	W of Bald Eagle WSA, E of Rte 6	- 16 mi. W of Segment 6C
Red Mountain WA	20,490	SE side of White Pine Mountains	- 2.0 mi. W of ETF Segment 6C
Red Rock Springs & Devil's Throat ACECs	1,483	On Utah border east of the S end of the ETF	- 45 mi. E of ETF Segment 11
Riordan's Well WSA	36,200	N ½ Grant Range, E. side, S. of US 6	- 1.5 mi. W of ETF Segment 6C
Ruby Lake NWR	39,926	Just E of Ruby Mts.	- 45 mi. NW of North Plant Site
Ruby Mts. WA	93,090	25 mi E of Elko	- 35 to 40 mi. W of Alternative Rail line
Seitz Canyon/Echo Lake RNA	2,039	Ruby Mountains	- 48 mi. W of Alternative Rail line
Shellback WA	36,143	NE side of White Pine Mts.	- 8.0 mi. W of ETF Segment 6C
South Egan Range WA	67,214	Mid-South portion Egan Range	- 8.5 mi. E of ETF Segment 6C

SPECIAL DESIGNATION AREA ^	SIZE OF AREA IN ACRES	GEOGRAPHIC LOCATION OF AREA	APPROXIMATE LINEAR DISTANCE FROM THE EEC ELEMENT
South Pahroc Range WA	25,800	South Pahroc Range S of US-93 and Pahroc Summit	- 4.5 mi. W. of ETF Segment 9B and 5 mi. N. of ETF Seg 9A
South Pequop WSA	34,544	Pequop Mts. N of Lages	- 4.0 mi W of Alternative Rail line
Steptoe Valley WMA	6,426	3 mi. south of Ely	- 18 mi. S of South Plant Site
The Wall WSA	38,000	S end Pancake Range & Railroad Valley	- 40 mi. W of ETF Segment 8
Troy Peak RNA	2500	in Grant Range WA about 30 mi. S of the town of Currant.	- 12.0 mi. W of ETF Segment 6C
Tunnel Springs WA	5,371	On Utah-Nevada border south of RR	- 35 mi. E of ETF Segment 9B
Virgin Mts. ACEC	35,830	On Utah border east of the S end of the ETF	- 42 mi. E of ETF Segment 11, adjoining Gold Butte ACECs
Virgin River ACEC	7,413	S of I-15, W of Utah border, on Virgin River	- 45 mi. E of ETF Segment 11, N of Virgin Mts. ACEC
Weepah Spring WA	51,480	Seaman Range, Timber Mt. and surrounding area	- 11.25 mi. S of ETF Segment 6C and 14.0 mi. W of ETF Segment 8
White Pine Peak RNA	787	9 mi. N of town of Currant, 41 mi. SW of Ely. Within the Currant Mountain Wilderness.	- 11.0 mi. W of Segment 6C of ETF near where Rte. 6 crosses the White Pine Mountains
White Pine Range WA	40,013	W side of Currant, or White Pine, Mts.	- 12.0 mi. W of ETF Segment 6C
White Rock Range WA	24,413	E of Wilson Ck Range on Utah border in NE Lincoln County	- 35.0 mi. W of ETF Segment 8
Worthington WA	30,664	S of Grant Mts., W of Garden Valley	- 48.0 mi. W of ETF Segment 9B

^ The following abbreviations are used:
WSA = Wilderness Study Area
WA = Designated Wilderness Area
ETF = Power Transmission Line
WMA = Wildlife Management Area
DNWR = Desert National Wildlife Refuge
RNA = Research Natural Area

3.13.4 Specific Project Area Conditions

3.13.4.1 Plant Sites

No SDAs occur within either of the proposed approximately 3,000-acre power plant areas. However, the following SDAs occur within 50 miles of the plant sites and are listed by type in **Table 3.13-1** above. It should be assumed that since the Mt. Wheeler Transmission Line would be located at either plant site that if an SDA is listed below, it occurs within 50 miles of that SDA as well.

- Bald Mountain WA: This 22,366-acre USFS wilderness was designated in 2006. It is located on the east side of the White Pine Range in the Humboldt National Forest and is part of a series of four wilderness areas in this range (Wilderness.net 2007). Bald Mountain WA is 38 miles south of the South Plant Site, and Segment 6C of the electric transmission facilities passes 5.5 miles east of this wilderness area.
- Becky Peak WA: This 18,119-acre BLM wilderness was established in 2006 and is located in the northern portion Schell Range between Water Canyon and Cherry Spring. It is east of, and across the Goshute Valley from, Goshute Canyon Wilderness (BLM 2007f). It is approximately 2 miles east of the North Plant Site and 30 miles north of the South Plant Site.
- Bristlecone WA: This BLM wilderness area is in the Egan Range due west of McGill. It was established in 2006 and is 14,095 acres in size. It is bordered by Mellison Canyon to the north and Hercules Gap to the south (BLM 2007f). It is approximately 35 miles south of the North Plant Site, 4.75 miles southwest of the South Plant Site, and 0.75 miles west of Alternative Segment 3.
- Cleve Creek Baldy RNA: This RNA is located within the High Schells WA (USFS Undated a), south of the North-South Schells RNA. It is approximately 15 miles east of the Gondor Substation, 19 miles southeast of the South Plant Site, and 45 miles south of the North Plant Site.
- Currant Mt. WA: This 47,357 acre BLM wilderness area was designated in 1989 and is located on the southwest side of the White Pine Range. Elk and deer are common here. This wilderness shares the White Pine Range with Red Mountain, Bald Mountain, Shellback, and White Pine Range wilderness areas (BLM 2007f). It is located approximately 8 miles west of Segment 6C and is approximately 50 miles southwest of the South Plant Site.
- Goshute Canyon WA: Established in 2006, this BLM wilderness area is located in the Cherry Creek Range just south of the border between Elko and White Pine counties. It is 42,544 acres in size. Paris Creek drains the central portion of this wilderness area (BLM 2007f). It is approximately 5.5 miles northwest of the North Plant Site and 35 miles north of the South Plant Site.
- Goshute Cave Geologic Area: This 120-acre area within Goshute Canyon WA is protected for its cave resources, including cave formations and bat habitat. It is located approximately 5.5 miles west of the North Plant Site and approximately 45 miles northwest of the South Plant Site, high on the side of the mountains of the wilderness area.
- Goshute Peak WSA: Located adjacent to and south of the Bluebell WSA, this BLM WSA has 69,770 acres under consideration for wilderness status. It is in the Goshute

Mountains at the south end of the Toano Range (BLM 2007f) and is about 42 miles south of I-80 and 6.5 miles east of the Alternative Rail Line, nine miles east of the existing NNRy, and 40 miles north-northeast of the North Plant Site.

- Government Peak WA: This BLM-managed wilderness area was designated in 2006 and is 6,313 acres in size. It is located in two parcels, one that abuts the USFS-managed Mt. Moriah WA, and another portion north of this in the Kern Mountains (BLM 2007f). It would be 32 miles east of the South Plant Site and 37 miles southeast of North Plant Site.
- Great Basin National Park: This 80,000-acre park is located west of Baker, Nevada, and includes Wheeler Peak, ancient Bristlecone pines, and extensive caves including Lehman Caves, tours of which are provided by the NPS. It is Nevada's only National Park and was designated as a park in 1986. It is about 40 miles from the South Plant Site and 48 miles east of Segment 6C.
- High Schells WA: This USFS wilderness area in the central portion of the Schell Creek Range is 121,497 acres in size and was designated in 2006 (Wilderness.net 2007). It would be approximately 30 miles south of the North Plant Site, 5 miles east of the South Plant Site, and within its boundaries is the North-South Schells Resource RNA (see below).
- Mt. Moriah WA: This jointly managed BLM/USFS wilderness is 89,790 acres in size and was designated in 1989. It is in the northern end of the Snake Range, north of Great Basin National Park (Wilderness.net 2007). It would be approximately 32 miles east of Alternative Segment 3 of the electric transmission facilities, 30 miles east-southeast of the South Plant Site, and 50 miles southeast of the North Plant Site.
- Mt. Moriah RNA: The 876 acres of this RNA were designated in 2000 to protect a unique, high elevation plateau that supports an extensive mosaic of subalpine steppe grassland, an uncommon community in the Humboldt-Toiyabe National Forest (USFS Undated a). The RNA is within the Mt Moriah Wilderness, which is north of Great Basin National Park. It would be located approximately 50 miles from Alternative Segment 3 of the electric transmission facilities and 35 miles east-southeast of the South Plant Site.
- North-South Schells RNA: This 4,021 acre area located in the High Schells WA (USFS Undated a) was set aside in 2000 for its outstanding alpine ridgeline with three mountain peaks composed of folded and faulted blocks of igneous, metamorphic, and sedimentary rocks. It contains eight representative and unique vegetation types, seven plant and animal species of special interest, and several landform and geologic types (USFS Undated a). It would be 12 miles southeast of the South Plant Site and 40 miles south-southeast of the North Plant Site.
- The Pony Express National Historic Trail (PET) passes through the Shell Creek Range at Shellbourne Canyon, crosses Steptoe Valley north of McGill, and then enters the Cherry Creek Range at Egan Canyon. It passes 10 miles south of the North Plant Site and 20 miles north of the South Plant Site. The 600 foot ROW for Segments 1A or 1B would cross the PET if the North Plant Site were chosen.
- Red Mountain WA: This USFS-managed wilderness was designated in 2006 and is 20,490 acres in size. It is located on the east side of the White Pine Mountains, south of Bald Mountain WA and east of Currant Mountain WA (Wilderness.net 2007). It would be approximately two miles west of Segment 6C and 45 miles south of the South Plant Site.

- Ruby Mountains WA: This wilderness was designated in 1989 and is 93,090 acres in size. The USFS-managed wilderness is a popular destination for people from Elko and farther away. With the Ruby Mountains National Wildlife Refuge at the south end of the range, this area of Nevada provides a surprising array of habitats that belie the state's arid nature (Wilderness.net 2007). The wilderness would be approximately 35-40 miles west-northwest of the existing NNRy railroad and Alternative Rail Line and 50 miles northwest of the North Plant Site.
- Shellback WA: This USFS-managed wilderness is located north of the Bald Mountain WA on the east side of the White Pine Range. Its 36,143 acres were designated in 2006 (Wilderness.net 2007). It would be located approximately eight miles west of Segment 6C and 32 miles southwest of the South Plant Site.
- South Egan Range WA: The BLM-managed South Egan wilderness is 67,214 acres and was designated in 2006. It shares the Egan Range with the Far South Egans WA. This range overlooks the White River Valley (BLM 2007f). The wilderness would be 8.5 miles east of Segment 6C and 42 miles south of the South Plant Site.
- South Pequop WSA: This BLM-managed WSA contains 76,534 acres proposed for wilderness designation, located in the southern half of the Pequop Mountains, less than 1 mile south of where the active UP railroad line passes through this mountain range. The WSA would be located approximately four miles west of the Alternative Rail Line and 40 miles north of the North Plant Site.
- Steptoe WMA: This state-run wildlife management area sits near the south end of Steptoe Valley. It is located about three miles due south of Ely. It is managed for waterfowl, fish, and hunting and provides a variety of habitats for game animals and small game as well (NDOW 2005). If constructed, the South Plant Site would be about 18 miles north of this WMA.

3.13.4.2 Electric Transmission Facilities

Electric transmission facilities would pass through or occur directly adjacent to eight SDAs. These are listed below and summarized in **Table 3.13-1** above.

- Arrow Canyon ACEC: This BLM area protects desert tortoise habitat and abundant rock art. It is located east of Arrow Canyon wilderness area and west of the Desert NWR. It adjoins Mormon Mesa and Coyote Springs ACECs to create a complex of protected desert tortoise habitat areas (Ludington 2004). Segment 11 passes through the western edge of this ACEC for approximately 10 miles.
- Coyote Springs ACEC: This 75,000 acre BLM managed ACEC is located adjacent to the southeast side of the Desert NWR. It is part of a series of land designated to protect desert tortoise (Ludington 2004). Segment 11 passes through this ACEC for approximately 18 miles.
- Delamar Mountains WA: This BLM wilderness area was designated in 2004 and is 111,328 acres in size. It is located in the Delamar Mountains just northeast of the Desert National Wildlife Refuge. Approximately 1.75 miles of Segments 9B and 9C are proposed to run along the western border of this wilderness area. The wilderness area provides habitat to desert bighorn sheep, raptors, and the threatened desert tortoise. Sensitive species such as the white bearpoppy and banded Gila monster, and cultural

resources including rock art, milling sites, and an obsidian quarry, are found within this wilderness area (BLM 2004).

- Desert National Wildlife Refuge: This refuge, created in 1936, is the largest wildlife refuge in the lower 48 states and encompasses 1.6 million acres of Mojave Desert in southern Nevada, just north of Las Vegas. This NWR is part of the larger Desert National Wildlife Refuge Complex, which includes the Ash Meadows, Moapa Valley, and Pahranagat National Wildlife Refuges, and the Amargosa Pupfish Station (USFWS 2007f). Segments 9D and 11 passes through the east edge of the NWR and Segment 11 would be within 5 miles of the refuge.
- Kane Springs ACEC: This 65,900 acre BLM managed ACEC adjoins the northeast side of the Desert NWR and includes the lower portion of Kane Springs Wash. It was designated as part of a group of public land designed to protect desert tortoise habitat and other wildlife that are threatened by habitat fragmentation and increased recreational use, especially OHV use, due to increasing human populations in surrounding areas. Segments 9D and 10 of the electric transmission facilities pass through or adjoin this ACEC for approximately 22 miles (BLM 2008a).
- Kirch WMA: This state-managed wildlife area is located east of the Grant Range in the White River Valley. The southern end of this riverine series of ponds and wetlands would adjoin Segment 6C of the electric transmission facilities for approximately 1/3 of a mile (NDOW 2005).
- Pahranagat National Wildlife Refuge: This refuge adjoins the northeast corner of the Desert NWR. It protects fish and waterfowl resources that utilize the White River where the river passes through the Pahranagat Valley. It is 5,380 acres in size (USFWS 2007g). Segment 9D of the electric transmission facilities would pass against its southeast border.
- The Pony Express National Historic Trail passes through the Shell Creek Range at Shellbourne Canyon, crosses Steptoe Valley north of McGill, and then enters the Cherry Creek Range at Egan Canyon. It would be crossed by either Segment 1A, 1B, and/or the Mt. Wheeler Transmission Line.

There are 52 SDAs that are within 50 miles of the proposed electric transmission facilities. These are described below and summarized in **Table 3.13-1** above.

- Arrow Canyon WA: This 27,530 acre BLM wilderness was designated in 2002. It is located east of US-93, just north of the Moapa Indian Reservation and is dominated by Arrow Canyon (Wilderness.net 2007). It would be approximately 2 miles east of Segment 11.
- Bald Mountain WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Beaver Dam Slope and Mormon Mesa ACECs: These ACECs adjoin Arrow Canyon and Coyote Springs ACECs, which adjoin the EEC electric transmission corridor. Each ACEC provides valuable habitat for the desert tortoise. Mormon Mesa on the west, and Beaver Dam Slope on the east stretch from the Desert NWR to the Utah border (BLM 2008a, Appendix Q). The west side of Mormon Mesa ACEC would be approximately 1.25 miles east of Segment 11, while Beaver Dam Slope is about 40 miles further east.
- Becky Peak WA: See Plant Sites above (**Section 3.13.4.1**) for description.

- Big Rocks WA: This 12,997-acre BLM wilderness, designated in 2004, is located between Hiko and Caliente at the south end of the North Pahroc Range. Its volcanic boulders and low elevation make it unique (BLM 2004). It would be located approximately 10 miles east of Segment 8.
- Blue Eagle WSA: This 14,300-acre WSA is located in the northern half of the Grant range and is adjacent to Riordan's Well WSA. Unlike the Grant Range WSA, Blue Eagle is on BLM land (BLM 2007f). It would be approximately 6 miles from Segment 6C.
- Bristlecone WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Cleve Creek Baldy RNA: See Plant Sites (**Section 3.13.4.1**) above for description.
- Clover Mountains WA: This 85,748-acre wilderness managed by the BLM was designated in 2004. It is accessed from Caliente, located approximately 10 miles to the north. The range is an ancient rhyolitic caldera of medium altitude (BLM 2004). Segment 8 would be located approximately 16 miles to the west of this wilderness.
- Far South Egan Range WA: This 36,384-acre managed wilderness was designated in 2004 and would be approximately 12 miles north and east of Segment 6C. It shares the Egan Range with the South Egan Wilderness and is bounded by the White River Valley on the west, through which the electric transmission facilities would pass, and Cave Valley on the east. It supports a unique mix of ponderosa and bristlecone pine (BLM 2004).
- Fortification Range WA: This 30,656-acre BLM wilderness was designated in 2004. It is located in the Fortification Range across Lake Valley from the Mt. Grafton Wilderness (BLM 2004). It is about 50 miles south of Ely and would be about 45 miles east of Segment 6C.
- Grant Range WA: Designated in 1989, this USFS wilderness is 52,600 acres in size and is located west of the White River Valley and east of the Railroad Valley. It is accessed only by dirt roads west of State Highway 318, south of Lund. Adjoining this wilderness to the south is the Quinn Canyon Wilderness (USFS Undated.b). The Grant Range WA would be approximately 10 miles west-southwest of Segment 6C.
- Gold Butte Part A, Part B and Virgin Mountains ACECs: These three ACECs are contiguous and protect scenic, historic, and prehistoric resources, as well as desert tortoise habitat. Gold Butte, part A is about 185,329 acres in area; Gold Butte, part B is about 121,082 acres and includes the Gold Butte Townsite ACEC, set aside specifically for historical preservation. The adjoining Virgin Mountains ACEC is about 35,830 acres (BLM 2007g). They would be located approximately 35 miles east of Segment 11.
- Goshute Canyon WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Goshute Cave Geologic Area: See Plant Sites above (**Section 3.13.4.1**) for description.
- Goshute Peak WSA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Hidden Valley ACEC: This ACEC is at the north end of the Muddy Mountains just northeast of Las Vegas. It was designated for its petrified wood resources, petroglyphs, and desert tortoise habitat (BLM 2008a, Appendix Q). It would be approximately 11 miles southeast of the Harry Allen Substation.
- High Schells WA: See Plant Sites above (**Section 3.13.4.1**) for description.

- Highland Ridge WA: Designated in 2006, this BLM-managed wilderness is 68,627 acres in size. It adjoins Great Basin National Park on its south border, and sits just north of the border of Nevada's White Pine and Lincoln Counties (Wilderness.net 2007). It would be located approximately 43 miles east of Segment 6C.
- Lake Mead NRA: Lake Mead was created by damming the Colorado River and was the largest dam in the world when it was built. Work began in 1931 and the area was designated as Boulder Dam Recreation Area in 1936. It provides water and electricity for millions of people and is an important source of irrigation water in the southwest. Lake Mead National Recreation Area was designated as the first National Recreation Area in 1964 (Wikipedia 2007b). It would be approximately 50 miles southwest of the Harry Allen Substation.
- Lime Canyon WA: This 23,233-acre wilderness was designated in 2002 and is administered by the BLM. It is on the east side of the Colorado River on the north end of Lake Mead and adjoins this National Recreation Area (Wilderness.net 2007). It would be approximately 50 miles east of the Harry Allen Substation.
- Moapa Valley NWR: This 106-acre refuge was established in 1979 to protect Moapa dace and their habitat (USFWS 2007h). It would be approximately 14 miles east of Segment 11.
- Meadow Valley Range WA: This 123,488-acre BLM wilderness was designated in 2004. It is 50 miles northeast of Las Vegas and is bordered on the northwest by Kane Springs Canyon and on the south by Route 168. It is made up largely of lower elevation bajada landforms (BLM 2004). This wilderness would be approximately 0.5 miles southwest of Segment 10.
- Mormon Mountains WA: This 157,938-acre wilderness, designated in 2004, is located just east of the Meadow Valley Range, separated only by Meadow Valley Wash (BLM 2004). It would be approximately 10 miles east-southeast of Segment 10.
- Mormon Mesa ACEC: See Beaver Dam Slope ACEC above.
- Mt. Grafton WA: This wilderness area was designated in 2006 with 78,743 acres and is located in the Schell Creek Range (BLM 2007f). It parallels and is approximately 0.75 miles west of US-93 at Geyser Ranch in Lake Valley. A power line parallels US-93 to the east. Segment 6C would be located approximately 20 miles to the west of this wilderness.
- Mt. Irish WA: This wilderness area is 28,334 acres in size and was designated in 2004. It is located about 8 miles west of Hiko and about 2 miles north of US Route 275. A dirt road accesses the center of the wilderness at Reed Spring (BLM 2004). This wilderness would be located approximately 30 miles from Segment 9B.
- Mt Moriah WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Mount Moriah RNA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Muddy Mountains WA: This wilderness area is 48,019 acres in size and was designated in 2002. It is managed by the BLM, and by the NPS on its southwest corner, where the wilderness overlaps Lake Mead National Recreation Area (Wilderness.net 2007). It would be approximately 10 miles southeast of the Harry Allen Substation.
- North-South Schells RNA: See Plant Sites above (**Section 3.13.4.1**) for description.

- Palisade Mesa WSA: This 99,500 acre, BLM-administered WSA is toward the southern end of the Pancake Range adjacent to the Wall WSA. The area is very rugged and difficult to access. It is characterized by steep walled canyons, spires, and clefts for technical climbers. Numerous ephemeral washes in solid rock cascade with water, but only after rainstorms. Peak ascents bring views of the nearby lunar crater volcanic field. The rugged terrain provides refuge for prairie falcons, other raptors, and desert bighorn sheep.
- Parsnip Peak WA: This wilderness of 43,693 acres was designated in 2004 and is managed by the BLM (BLM 2004). It is located in the Wilson Creek Mountains about 15 miles north of Pioche. It would be approximately 25 miles from Segment 8.
- Quinn Canyon WA: This USFS-managed wilderness was designated in 1989 and is 26,310 acres in size. It is located just south of the Grant Range Wilderness, in the mountains of the same name. It contains year-round springs and streams, which is uncommon in Nevada Wilderness (USFS Undated b). It would be located approximately 14 miles west of the junction of Segments 6 and 8.
- Railroad Valley WMA: This state WMA area is on BLM land and is managed in cooperation with the Duck Valley Tribe. It is in four parcels spread across the Railroad Valley west of Blue Eagle WSA and just south of U.S. Highway 6. It is 14,720 acres in size and provides wildlife viewing and bird watching opportunities (NDOW 2007b, 2007c). It would be located about 16 miles west of Segment 6C.
- Red Rock Springs/Devils Throat ACEC: These two adjoining ACECs are each less than 741 acres and are surrounded by Gold Butte Parts A and B ACECs. They were preserved because of their scenic, archaeological, and geological resources (BLM 2008a, Appendix Q). They would be approximately 45 miles east of Segment 11 and the Harry Allen Substation.
- Red Mountain WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Riordan's Well WSA: This proposed 36,200-acre WSA is on BLM land to the north of the Grant Range. It abuts the Blue Eagle WSA, which is to the north and west (BLM 2007f). It would be approximately 1.5 miles to the west of Segment 6C.
- Shellback WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- South Egan Range WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- South Pahroc Range WA: This 25,800-acre wilderness managed by the BLM was designated in 2004 and supports a wide variety of large mammals, including re-introduced big horn sheep. It is located west of Caliente and is bordered by the 6-mile and 8-mile valleys to the west and the Pahroc Valley to the east. US-93 passes 4 miles to the north. Segment 9B would pass approximately 4.5 miles to the east of the south end of this wilderness area, and Segment 9A would pass 5 miles south of this wilderness area.
- Troy Peak RNA: This 2,500-acre RNA covers the highest elevations of the Grant Range and is within the Grant Range Wilderness. The area was designated to protect unique rock barrens and three plant species: the Nevada primrose (*Primula nevadensis*), waxflower (*Jamesia tetrapetata*), and Nachlinger's catchfly (*Silene nachlingerae*) (USFS Undated a). The RNA would be approximately 12 miles west of Segment 6C.

- Tunnel Springs WA: This 2004-designated wilderness covers 5,371 acres of BLM land. It is located on the Utah-Nevada border and adjoins the north border of Beaver Dam State Park. It is accessed from Caliente via the State Park or from the Dixie National Forest in Utah (BLM 2004). It would be located approximately 40 miles east of Segment 9B.
- Virgin Mountains ACEC: See Gold Butte Part A, Part B in this section, above.
- Virgin River ACEC: This ACEC follows the riparian zone of the Virgin River as it flows from the Utah-Nevada border toward Las Vegas. It is south of I-15. It was designated to protect riparian species, such as the southwestern willow flycatcher, a designated threatened species. The ACEC also contains habitat for desert tortoise. It is approximately 7,413 acres.
- The Wall WSA: This 38,000-acre WSA is located approximately 75 miles east of Tonopah on BLM land. "The Wall" was named for its sheer, black, vertical face. It is a volcanic formation of magma and ash. The back side of the wall is a labyrinth of gullies and washes. The vertical perspective created by the Wall, which has vertical relief between 600 and 2,000 feet in height, gives the impression of an impenetrable fortress looming over the flat sands and playas of the Railroad Valley. It would be located approximately 45 miles west of Segment 8.
- Weepah Springs WA: This 51,480-acre BLM-managed wilderness was designated in 2004. It is located in the Seaman Range and Timber Mountain, about 20 miles north of Hiko (BLM 2004). It would be approximately 16 miles southwest of Segment 8.
- White Pine Range WA: This 40,013-acre wilderness is managed by the USFS and is on the west side of its namesake range. Other wilderness areas in this range include the Shellback, Bald Mountain, Currant Mountain, and Red Mountain wildernesses (USFS Undated.b). The White Pine WA would be approximately 12 miles west of Segment 6C.
- White Pine Peak RNA: This 797-acre RNA, located within the Currant Wilderness, supports nearly pristine shrublands dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and bluebunch wheatgrass (*Pseudoroegneria spicata*). Although typical vegetation of the Great Basin, the dominance of these species is being challenged by invasives at lower elevations (USFS Undated a). This RNA would be located approximately 11 miles from Segment 6C.
- White Rock Range WA: This BLM wilderness area is 24,413 acres and was designated in 2004. It is located east of the Wilson Creek Range on the Utah border just north of the Beaver-Iron County (Utah) line (Wilderness.net 2007). It would be approximately 35 miles east of Segment 8.
- Worthington Mountains WA: This wilderness is 30,664 acres in size and was designated as wilderness in 2004. It is located south of the Grant Mountains and several miles north of US Route 375 (BLM 2004). Segment 9B would be located approximately 48 miles east of this WA.

3.13.4.3 Water Supply and Rail Facilities

The Pony Express Trail intersects the majority of the Water Supply Facilities and the Alternative Rail Line.

No other SDAs would occur within these Project elements, but 17 additional SDAs occur near or within 50 miles of the water supply facilities or rail line routes. These are described below and listed in **Table 3.13-1** above.

- Becky Peak WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Bristlecone WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Bluebell WSA: This BLM WSA is proposed at 55,665 acres in the Toano Range (BLM 2007f), east of the proposed and existing rail lines' northern terminus. It would be approximately 5 miles from the Alternative Rail Line ROW and 6 miles from the existing NNRy.
- East Humboldts WA: This wilderness, designated in 1989, is managed by the USFS. Hole-in-the-Wall Peak is the highest point at 11,127, with Humboldt Peak being just 107 feet lower. Aspen and mountain mahogany are found on the upper slopes of the range, which extends into a glaciated alpine zone where gneiss, schist, and granite rocks are exposed. The range has six lakes stocked with trout. Other animals inhabiting the area include bobcats, deer, mountain lions, and mountain goats. The wilderness contains several trails that access the high country. It is approximately 45 miles west of Shafter.
- Franklin Lake WMA: This state WMA is located in the same area of wetlands as the Ruby Lake NWR and is located just to the north. It is approximately 2,400 acres in size (NDOW 2005) and is approximately 36 miles west of the existing NNRy and Alternative Rail Line.
- Goshute Canyon WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Goshute Peak WSA: See Plant Sites above (**Section 3.13.4.1**) for description.
- High Schells WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Hole-in-the-Mountain RNA: This RNA is 1,676 acres in size and includes the summit of Hole-in-the-Mountain Peak. This USFS-managed area is a glaciated alpine zone supporting whitebark pine (*Pinus albicaulis*), alpine willows, moist meadows, fell-fields, and talus and scree slopes. Two endemic plants – the Lamoille Canyon milkvetch (*Astragalus robbinsii* var. *occidentalis*) and small-flower beardtongue (*Penstemon procerus* var. *modestus*) – are found in these alpine meadows. It is approximately 45 miles west of Shafter.
- Mt. Moriah WA: See Electric Transmission Facilities above (**Section 3.13.4.2**) for description.
- Mt. Moriah RNA: See Electric Transmission Facilities above (**Section 3.13.4.2**) for description.
- North-South Schells RNA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Pearl Peak RNA: Located in the southern Ruby Mountains just 4 miles east of the Ruby Lake NWR, this high elevation area is underlain by calcareous parent materials and supports a wide array of plant communities. Its 665 acres were set aside in 1998 and are

managed by the USFS (USFS Undated a). It would be approximately 48 miles west of the Alternative Rail Line.

- Ruby Lake NWR: This 39,926 acre refuge was designated in 1938. It is located on the largest flyway between the Pacific and Mississippi Flyways. It is directly to the southeast of the Ruby Mountains. Many tourists visit the mountains and the refuge due to the array of easily accessible habitats and scenic qualities of these areas (USFWS 2007i). It would be located approximately 45 miles west of the existing NNRy and Alternative Rail Line.
- Ruby Mountains WA: See Plant Sites above (**Section 3.13.4.1**) for description.
- Seitz Canyon/Echo Lake RNA: This 2,039-acre RNA is located at the headwaters of Echo and Rabbit Creeks, the latter of which is within Seitz Canyon. The RNA is partially within the Ruby Mountain WA, which is managed by the USFS. The sub-alpine and alpine lands within the RNA include classic examples of glacially carved terrain including U-shaped valleys, lateral moraines, cirque basins, perennial lakes, and a nunatak – a relict area that remained ice-free during glaciation. Two species of interest occur within the RNA: the Lamoille Canyon milkvetch (*Astragalus robbinsii* var. *occidentalis*) and the Ruby Mountain primrose (*Primula capillaris*). It would be located approximately 48 miles west of the existing NNRy and Alternative Rail Line.
- South Pequop WSA: See Plant Sites above (**Section 3.13.4.1**) for description.

3.14 Recreation

3.14.1 Area of Analysis

The area of analysis for direct and indirect effects on recreation resources comprises a 50-mile radius from major project elements (e.g., power plant sites) and a 50-mile buffer along linear project elements (e.g., transmission, water, and rail lines).

3.14.2 Data Sources and Methods

The information used to characterize developed recreation resources in the project area were gathered from a variety of sources, predominated by information from the Elko, Ely, and Southern Nevada BLM District Offices, USFS, and NPS. State and local resources and their use were gleaned from other publicly available sources from the Nevada Division of State Parks and Department of Wildlife.

3.14.3 Existing Conditions

As indicated in **Table 3.12-1** above, public lands (those managed by federal, state, or county entities) account for the vast majority of land in the counties affected by the proposed project. Recreational use on public lands is governed by management plans outlined in **Section 3.14.3.1** below. Much of these public lands are managed to allow for dispersed recreation, as described in **Section 3.14.3.2** below. A number of developed recreation areas are located within a 50-mile radius of the project components, as described in **Section 3.14.3.3** below. In addition, a limited number of private enterprises offer recreation opportunities, such as campgrounds and RV parks.

3.14.3.1 Existing Recreation Management Plans and Policies

A number of land management plans and policies apply to the project area. These include BLM RMPs, the Statewide Comprehensive Outdoor Recreation Plan (SCORP), and county land use

regulations. These plans and policies as they relate to recreation opportunities are described further below.

3.14.3.2 Federal Recreation Management Plans, Policies, and Statutes

Federal lands that would be directly impacted by the proposed action are BLM lands. As described in **Section 3.12.3** above, three BLM district offices administer the proposed project lands (Ely, Elko, and Southern Nevada). Within these BLM districts, three resource areas are identified and have management plans in place that govern use, including recreation. The proposed project may also impact the Pony Express National Historic Trail (described in **Table 3.13-1** above).

BLM Wells Resource Area RMP

The 1985 RMP/ROD for the Wells Resource Area RMP (discussed above under **Section 3.12.3.1** above) established several recreation management actions for implementation. Those pertinent to the area of analysis include upgrading the Ruby Marsh campground facilities, designating the majority of the Resource Area as open for OHV use, and actively managing for dispersed recreation (BLM 1985). Recreation use in the Wells Resource Area is generally light and dispersed and includes camping, hunting, fishing, and sightseeing.

BLM Ely RMP

The BLM Ely District Office RMP (BLM 2008a) is described in detail in **Section 3.12.3.1**. The new RMP replaces the Egan Resource Area RMP, the Caliente and Schell Management Framework Plans (MFPs), and incorporates relevant sections from the Caliente MFP Amendment.

A majority of the planning area is available for dispersed, backcountry, and undeveloped recreational uses. These areas will be managed as extensive recreation management areas. These areas include trails, routes, trailheads, staging areas, and associated structures. The new RMP will provide for management of five Special Recreation Management Areas (SRMAs) (one existing and four new), including development of SRMA plans, and established areas and routes for permitted motorized competition events.

BLM Southern Nevada (Las Vegas) Resource Area RMP

Similar to the other resource areas, the Las Vegas RMP (BLM 1998a) notes that the principal recreation opportunities are for casual or dispersed recreational activities, such as caving, photography, automobile touring, backpacking, birdwatching, hunting, hiking, and competitive and non-competitive off-highway vehicle (OHV) use. SRMAs in the Resource Area will be managed to provide recreation opportunities appropriate to the resource. Several SRMAs are managed, at least in part, for OHV use.

National Park Service Historic Trails Management Plan

The NPS completed a Comprehensive Management and Use Plan and Final EIS in 1999 for the Pony Express National Historic Trail along with three other historic trails. The document focuses on the Trail's purpose and significance, issues, and concerns related to current conditions along the trail, resource protection, visitor experience and use, and long-term administrative and management objectives. The plan identifies high-potential route segments and sites. High-potential segments are "Those portions of trail which would afford a high quality recreation experience in a portion of the route having greater-than-average scenic values or affording an opportunity to vicariously share in the experience of the original users of the historic route." High-potential sites are "Those historic sites related to the route which provide opportunity to

interpret the historic significance of the trail during the period of its major use." In the project area, the National Park Service identifies the Overland Canyon to Simpson Park Station segment of the Pony Express National Historic Trail as a high-potential segment (NPS 2007b).

Lake Mead National Recreation Area Lake Management Plan

In 1986, the *Lake Mead National Recreation Area General Management Plan (GMP) and Final Environmental Impact Statement* established land-based management zones and strategies for meeting the goals and general purposes of the recreation area. Since that time, management issues related to the increase in recreational use of the lakes, visitor conflicts and safety, potential impacts on park resources from water-related recreation, and personal watercraft use surfaced that have not been adequately addressed or resolved in previous planning efforts. In 1992 park managers determined that the development of a lake management plan was necessary to address issues surfacing from increased visitation to Lakes Mead and Mohave (NPS 2002).

The Lake Management Plan, finalized in 2003, tiers from the 1986 GMP. The plan addresses recreational use of approximately 160,000 acres of water contained within the 1.5 million acre National Recreation Area. The document addresses recreational issues including recreational carrying capacity and zoning, developed areas and facilities, sanitation and litter, recreational services and visitor conflict affecting the recreational setting (NPS 2003).

Lincoln County Conservation, Recreation and Development Act of 2004

The Act directed BLM to convey to the State of Nevada the parcels of land identified as 'NV St. Park Expansion Proposal.' This effectively increased the size of these state parks. The Act conveyed lands to the USFWS and increased the size of the Desert National Wildlife Refuge. Implementation of the Silver State OHV Trail was also provided.

White Pine County Conservation, Recreation and Development Act of 2006

The Act expanded 2 existing wilderness areas and designated 12 new wilderness areas. The law also supports a three-year study for a potential extension of the Silver State OHV trail, promotes resource protection, and a county-wide recreation study.

State Comprehensive Outdoor Recreation Plan

The State Comprehensive Outdoor Recreation Plan (SCORP), prepared by the Nevada Division of State Parks (2004), provides an assessment of Nevada's characteristics, people, resources, and recreational activities and critical recreation issues facing the state. Nevada has a variety of natural resources available to the public for participation in outdoor recreation activities. Nevada has more mountain ranges and public lands than any other state except Alaska (Nevada Division of State Parks 2004).

The SCORP reported that 84 percent of Nevadans 16 years of age and older participated in at least one outdoor recreational activity in the year 2000. In that same year, the percent of Nevadans 16 years of age and older participating in specific outdoor recreation activities was as follows: 44 percent pleasure driving, 37 percent picnicking, 32 percent swimming in a pool, 32 percent walking without a dog, 31 percent wildlife viewing, 30 percent swimming in a lake or stream, 28 percent hiking, 28 percent walking with a dog, 27 percent motorboating, and 26 percent lake fishing. In 2002, Nevadans participated in an estimated 235 million annual participation days of outdoor recreational activities in Nevada (Nevada Division of State Parks 2004).

Nevada has a high percentage (approximately 88 percent) of land administered by the federal government. The SCORP reported that 99 percent of the residents in Nevada living in rural areas said that the management of Nevada's public lands is either very important (98 percent) or important (1 percent) to them (Nevada Division of State Parks 2004).

The SCORP identified future recreation issues and actions for the state as a whole. The top five prioritized issues were:

- Public Access to Public Lands for Diverse Outdoor Recreation – There is a growing public desire to protect, maintain, and increase public access to public lands for the greatest diversity of outdoor recreational users.
- Funding Parks and Recreation – The maintenance of outdoor recreation areas and facilities at the federal, state, and local levels in Nevada has not kept pace with demands created by the rapid increases of population in Nevada and the increasing number of out-of-state visitors.
- Recreational Trails and Pathways – One of the greatest assets in Nevada to attract tourists to the state is the natural resource base found largely on public lands, and trails compliment this expansive natural resource base.
- Balancing the Protection of Nevada's Natural, Cultural, and Scenic Resources with Users – Find an appropriate balance between outdoor recreation activities (consumptive by definition) and preserving natural, cultural, and scenic resources.
- Protecting Water Resources as Vital Components of Nevada's Recreational Base – Because Nevada is the driest state in the U.S., it is critical that water resources be protected to maintain the needed quantity, quality, and accessibility for public recreation. Recreation and wildlife depend on the limited water resources in Nevada.

County Recreation Management Plans and Policies

Elko County

There is no comprehensive county-wide plan that addresses the management of recreation resources.

White Pine County

The White Pine County Land Use Plan (White Pine County 1998) encourages development of county-wide recreation areas and supports activities by participating in county-wide youth programs and activities, enhancing and preserving existing recreational facilities, and supporting new recreational facilities in the county.

The White Pine County Public Land Use Plan (White Pine County 1998), a coordinated land use planning effort among the county, BLM, and USFS, encourages dispersed recreational opportunities. The plan also states that federally managed lands with the value for concentrated recreation use (campgrounds, water recreation sites, etc.) should be identified, developed, and managed for recreational purposes.

Nye County

There is no comprehensive county-wide plan that addresses the management of recreation resources.

Lincoln County

The Lincoln County Master Plan (2006) describes a lightly populated county dominated by federal land ownership. Low population density creates financial constraints on development of county-level public and private recreation opportunities. Through the plan, the County seeks to work with federal land managers to plan for development and expansion of recreation opportunities; to develop a recreational opportunities inventory; to seek outside sources of funding for improvement of recreational facilities; and to expand it's website to promote tourism opportunities in the county.

The Lincoln County Strategic Tourism Plan (Harris et al. 2004), prepared by the University of Nevada Center for Economic Development, notes that there are few developed recreation sites in the county. Most recreation in the county is resource-based and dispersed. The rural communities of Pioche, Caliente, and Alamo all offer cultural heritage sites, local parks, camping, hiking, and, hunting opportunities. Lincoln County is also home to "Area 51" and the Extraterrestrial Highway (U.S. Highway 375) that extends from Alamo to Rachel and draws visitors to the region (Harris et al. 2004).

Clark County

The Clark County Comprehensive Plan has elements that discuss land use and recreation policies and standards (Clark County 2007b). The proposed 500-kV transmission lines would terminate at the Harry Allen Substation in the northeast portion of Las Vegas Valley. This area is designated as heavy industrial land use. Lands north of this area to the county line are designated as open space.

3.14.3.3 Recreation Opportunities

Open space and wildlands are very important to Nevadans. According to the 2004 SCORP, 100 percent of Nevada residents living in urban areas and 99 percent of rural Nevada residents said that the management of Nevada's public lands was important or very important. In 2001, 67 percent of Nevada residents surveyed wanted to set aside more designated wilderness areas in the state, and over 90 percent said that maintaining unique or unusual natural and historical areas was important to them. In 2002, Nevada voters approved a measure to issue $200 million in bonds for conservation and resource protection. In the 2004 SCORP survey, public access to public lands was listed as the number one issue for people interested in outdoor recreation. The expansive federal lands in Nevada are viewed as a valuable economic resource (Nevada Division of State Parks 2004).

Dispersed Recreation Areas

Popular dispersed recreation activities include OHV use, including 4-wheel drive vehicles and ATVs; hiking, horseback riding, mountain biking, rock collecting, picnicking, primitive or backcountry camping, wildlife viewing, hunting, boating, and fishing. BLM public lands also accommodate permitted annual events including events such as truck, buggy, motocross, and bike races, Pony Express Trail endurance and reenactment rides, and club rocket launches (BLM 2008). With regard to OHV use and motorized competitive events, The Ely RMP:

- Limits OHV use to designated roads and trails on approximately 10.3 million acres within the planning area boundary.
- Allows for a maximum of two competitive truck events per year.
- Closes all desert tortoise ACECs to all high-speed, competitive OHV use, and limits organized non-speed OHV events (BLM 2008a).

In order to manage recreation in conjunction with the other multiple uses on BLM lands, the BLM has established the following designations:

- BLM Ely District Extensive Recreation Management Areas (ERMA)

  Most public lands within and in the vicinity of the project area are open to dispersed recreation, and are managed as ERMAs, which are areas that include all BLM lands outside SRMAs. ERMAs typically do not contain organized or developed areas facilitating recreational activities, such as campgrounds. Rather, recreationists receive broad guidance on appropriate recreational uses that are consistent with multiple resource management.

- BLM Ely District SRMAs

  A SRMA is an area where more intensive recreation management is needed, where a commitment has been made to provide specific recreation activity and experience opportunities, and where recreation is a principal management objective (BLM 2008a). The Loneliest Highway, North Delamar, and Chief Mountain SRMAs may be affected by the Proposed Action.

- BLM Ely District Special Recreation Permit (SRP) Areas

  Four SRP areas totaling approximately 1.3 million acres will be managed to provide opportunities for competitive motorcycle and truck special recreation permitted events, with competitive events managed on designated routes. The SRP's that may be affected by the proposed action include Ely, Caliente, Pioche, and Alamo.

In addition to their value for their special designations, these areas are also valuable recreation areas. Hunting and wildlife viewing are important recreation activities in Nevada. Wilderness areas, wilderness study areas, wildlife refuges, and state wildlife management areas, in particular, are managed for values other than recreation; however, they are extremely valuable for dispersed recreation. As it relates to recreation, wilderness, and wilderness study areas, the Ely RMP:

- Closes designated wilderness to motorized and mechanized travel according to policy and enabling legislation.
- Closes the Park Range, Blue Eagle, Antelope Range, and Riordan's Well wilderness study areas to motorized and mechanized travel.

Big game hunting units 111 and 121 are located in Steptoe Valley and offer opportunities for mule deer, Rocky Mountain elk, and pronghorn antelope hunting. The proposed plant site and other project elements in Steptoe Valley would be located within Unit 121.

Unit 111 comprises the portion of White Pine County bounded on the west by US-93, on the south by US-6/50, and on the east by State Route 893 and the North Spring Valley Road to Alternate US-93. The use of ATVs across the unit is increasing. Unit 111 has the majority of the mule deer in this unit group followed by Units 112 and 113. (NDOW 2008)

Unit 121 consists of part of Elko County east of the Butte Valley Road and southwest of US-93 and that portion of White Pine County west of US-93, north of US-50, and east of the Butte Valley 30-Mile Road. Most mule deer on this unit are found in the mountain brush/aspen zones. Elk are well distributed in this area in low numbers. Steptoe Valley between McGill and Currie provides habitat for the majority of antelope on this unit (NDOW 2008). Hunter congestion has not been a problem as game and hunters are generally well dispersed.

Developed Recreation Opportunities

More than 30 developed recreation areas and sites occur near the proposed locations of project elements. These sites, along with other recreation resources within 50 miles of major project elements are shown in **Figure 3.14-1** below. These are areas that have been developed or are maintained and regionally recognized as locations for specific recreational activities and opportunities. Most of the areas and sites listed below are associated with resource-based recreation activities.

3.14.4 Specific Project Area Conditions

Table 3.14-1 lists areas with specific designation for recreation management (BLM 2008a) within a 50-mile radius of the project components in Steptoe Valley (e.g., plant sites, well fields, substations) and associated linear elements (e.g., transmission, water, and rail lines). All of the proposed project components that would be located on public lands would be in areas of dispersed recreation. In addition to their value for their special designations, these areas are also valuable recreation areas. While wilderness areas, wilderness study areas, wildlife refuges, and most state wildlife management areas offer opportunities primarily for dispersed recreation, some limited developed recreation opportunities exist within a few of these special designations. Some wildlife refuges and state wildlife management areas provide interpretive facilities, boat launch ramps, and docks, for example. Upland game bird hunting areas are also dispersed throughout the project area.

Table 3.14-2 below lists developed recreation areas within a 50-mile radius of the various project components. None of the proposed project components would be located in developed recreation areas and sites.

3.14.4.1 Plant Sites

The plant sites under both the Proposed Action and its alternative would be located within 50 miles of 3 SRMAs and an SRP area (**Table 3.14-1**). The plant sites would also be within 50 miles of approximately 22 developed recreation sites (**Table 3.14-2**).

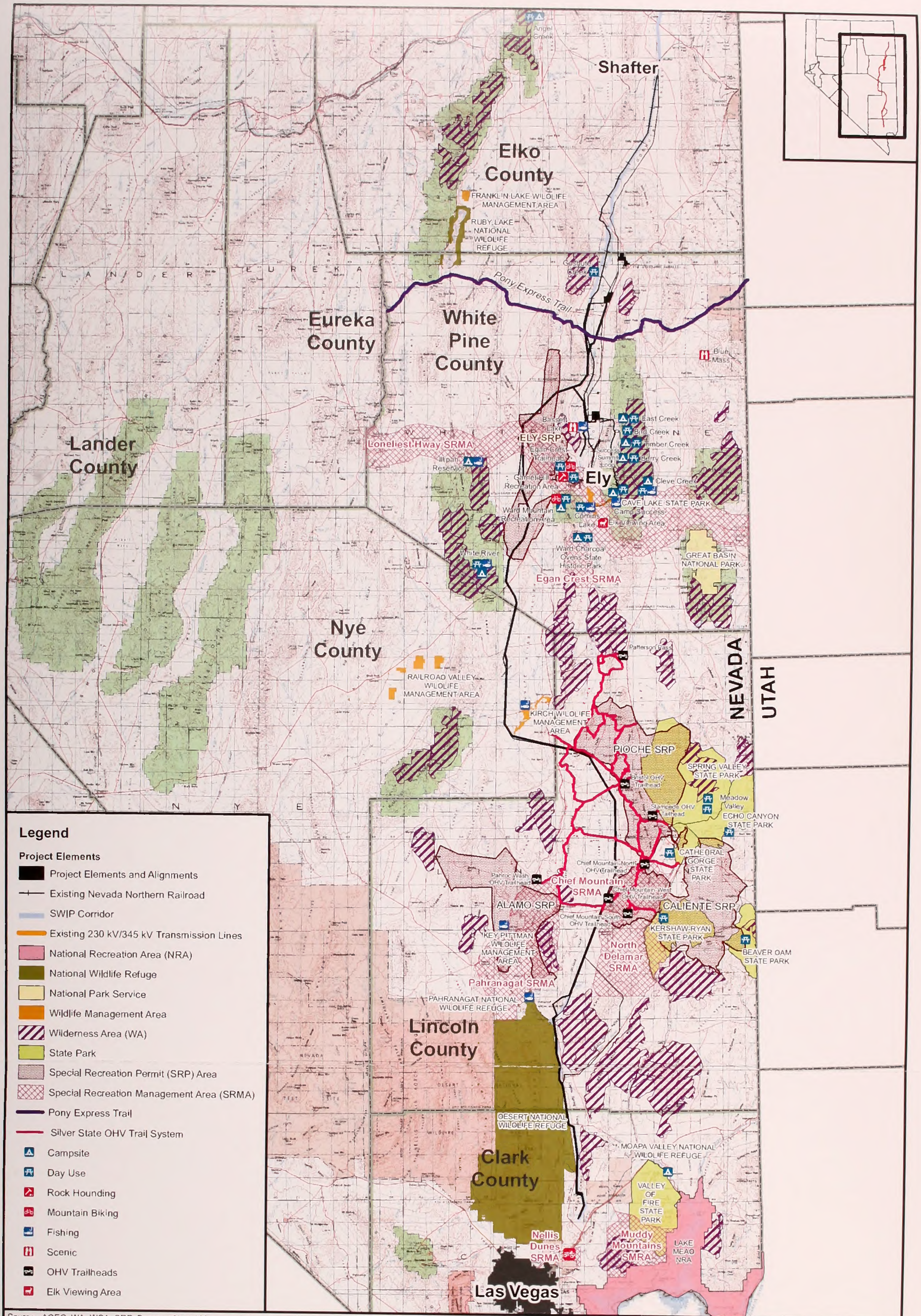
3.14.4.2 Electric Transmission Facilities

Electric transmission facilities would be within 50 miles of 7 SRMAs and 4 SRPs (**Table 3.14-1**) and 30 developed sites (**Table 3.14-2**). Certain segments of the electric transmission line ROWs are located within or adjacent to popular big game range and overlap hunting districts. The proposed transmission lines would occur immediately adjacent to the Desert NWR. Minimal developments within the Desert NWR are located at the Corn Creek Field Station, several miles southwest of the utility corridor. The Kirch Wildlife Management Area and the Pahranagat National Wildlife Refuge are also located near the electric transmission line ROWs.

The transmission lines (including the Mt. Wheeler and potential alternate transmission lines) would cross the Loneliest Highway, Chief Mountain, and North Delamar SRMAs. Transmission line facilities would also cross the Ely SRP Area and the Pony Express Trail.

3.14.4.3 Water Supply Facilities

Water supply facilities would be within 50 miles of 2 SRMAs and the Ely SRP (**Table 3.14-1**) and 21 developed sites (**Table 3.14-2**). The water facility sites under both the proposed action and its alternative would be located within lands managed as ERMAs and would cross the Pony Express Trail. No SRMAs or SRP areas would be affected by the proposed action or its alternatives.



Source - ACEC, WA, WSA, SRP: Bureau of Land Management
WA AND RMA: U.S. Forest Service
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada Reno).

Scale is 1:500,000 when printed at 11"x17"

FIGURE 3.14-1
EXISTING RECREATION AREAS AND SITES
ELY ENERGY CENTER

TABLE 3.14-1. AREAS WITH SPECIFIC DESIGNATIONS FOR RECREATION MANAGEMENT OFFERING DISPERSED RECREATION OPPORTUNITIES

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
The Loneliest Highway SRMA**	Along and on either side of US-50 as it transects the Ely BLM District.	X	X	X	X	This SRMA contains some of the most popular destinations. The management objectives of the SRMA are to provide a broad recreation opportunity spectrum ensuring a balance of recreation experiences. Developed recreation opportunities found within the Loneliest Highway SRMA are described in **Table 3.14-2** below.
Chief Mountain SRMA**	Northwest of Caliente, north of US-93, west of SR-317, and south of SR-320.		X			To be managed for a broad recreation opportunity spectrum ensuring a balance of recreation experiences on approximately 111,181 acres.
Egan Crest SRMA**	Approximately 15 miles directly south of Ely, and approximately 5 miles northeast of Lund.	X	X	X	X	To be managed for a broad recreation opportunity spectrum ensuring a balance of recreation experiences on approximately 53,455 acres.
Pahranagat SRMA**	Either side of US-93 from just south of Alamo to the intersection of US-93 and SR-375; and northeast of Hiko north of US-93 and east of SR-318.		X			To be managed for a broad recreation opportunity spectrum ensuring a balance of recreation experiences on approximately 298,500 acres.
North Delamar SRMA**	Just south of Caliente, either side of SR-317.		X			To be managed for a broad recreation opportunity spectrum ensuring a balance of recreation experiences on approximately 202,890 acres.
Ely SRP Area**	A linear narrow strip of land stretching north from the intersection of SR- 318 and US-6, ending southwest of Cherry Creek.	X	X	X	X	

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
Pioche SRP Area**	Either side of US-93 North of Pioche, to just north of the intersection withSR-894. Roughly bounded on the south by SR-320.		X			
Alamo SRP Area**	Either side of US-93 and SR-318 and SR-375, surrounding Hiko.		X			
Caliente SRP Area**	Northwest of Caliente, mostly north of US-93 and west of SR- 317, and mostly southeast of Panaca, south of SR- 319 and east of SR- 317.		X			
Muddy Mountains SRMA	East of Las Vegas.		X			This SRMA is managed for primitive and semi-primitive recreation opportunities including camping, hiking, and sightseeing. The Bitter Spring Back-country Byway bisects the SRMA. The SRMA is partially motorized and partially non-motorized. Some motorcycle racing occurs in the eastern portions of the SRMA, but most OHV opportunities are for trucks and SUVs (BLM 1998a).

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
Nellis Dunes SRMA	Approximately 15 miles northeast of Las Vegas		X			The Nellis Dunes SRMA is open to unrestricted OHV use. It is the closest resource to the Las Vegas metropolitan area for legal OHV use. The SRMA supports approximately eight OHV events annually, including large scale organized OHV races. There is growing popularity for commercial 4x4 tours, with two commercial tour guides operating almost exclusively at the SRMA. Several other commercial tours are also authorized for operation at the SRMA. The area receives a high volume of use during spring, fall, and winter, but use does occur year round. The SRMA is currently undeveloped, but BLM is working with Clark County to develop a plan. The area is closed to both camping and hunting (BLM 1998a).
Valley of Fire SP	55 miles northeast of Las Vegas via I-15		X			Popular dispersed recreation includes hiking, camping, picnicking, and photography (NDSP 2008).
Lake Mead NRA	East and south of Las Vegas along the Nevada – Arizona state line, and extending north from the state line east of Valley of Fire SP.		X			Lake Mead NRA consists of 160,000 surface acres of Lake Mead and Lake Mohave surrounded by 1.5 million acres of land. Dispersed recreational activities include hiking, camping, and boating (NPS 2008).

*Includes proposed plant sites, the associated worker villages, and the Mt. Wheeler Transmission Line.
**Source: BLM 2008a

TABLE 3.14-2. DEVELOPED RECREATION OPPORTUNITIES

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
FEDERAL						
Angel Creek Campground	Eight miles south of Wells, Nevada on SR-231				X	Angel Creek is a campground nestled in a grove of aspen trees at the base of the Humboldt Wilderness Range and near Angel Lake. The campground has 18 campsites. Primary recreation activities include picnicking, fishing, hiking, and horseback riding (USFS 2007b).
Berry Creek Campground	Five miles north of McGill on US-93, then 10 miles east on NV 486, then 5 miles east on Forest Service Road 424	X	X	X	X	The Berry Creek Campground is located in a white fir forest around the confluence of the North Fork and South Fork of Berry Creek. The campsite offers hunting, fishing, and hiking (USFS 2007a).
Bird Creek Campground	Located in the Duck Creek Basin approximately 14 miles northeast of McGill off of Forest Service Road 426.	X	X	X	X	The campground has eight group use sites for RVs and tents, concrete pads, fire pits and cooking grills, drinking water, and a vault toilet. Bird Creek, a perennial stream, runs through the middle of the picnic area. Hiking is the primary recreational activity (USFS 2007a).
Blue Mass Scenic Area	From Baker follow US-6/50 18 miles northwest to Eight Mile Ranch Road, then north 42 miles to the intersection of Old Lincoln Highway. Travel northeast 12 miles to Tippett, then southeast on Pleasant Valley Road for 12 miles.	X	X	X	X	The Blue Mass Scenic Area is a remote recreation site located east of Spring Valley in the Goshute Mountains. It is a scenic locale with streams and springs, old cabins, granite cliffs and pinnacles, and lush vegetation (Leisure and Sport Review 2007).
Chief Mountain OHV Area	The south access point is located at Oak Springs Summit on the north side of US-93 about 5 miles west of Caliente, Nevada (BLM 2008a).		X			The Chief Mountain area is frequently used for off-highway vehicles. There is a trailhead in conjunction with three designated OHV trails: the Red Rhyolyte Trail, Grey Dome Trail, and Silver State Trail (Lincoln County 2008). The area is scenic and has a good network of social trails.
Cleve Creek Campground	Approximately 43 miles from Ely traveling northbound on SR-893 from US-6/50.	X	X	X	X	Cleve Creek Campground is located in Spring Valley near the mouth of a major drainage on the east side of the Schell Creek Range. Cleve Creek is a year-round stream that supports abundant vegetation at the campground. Fishing, hiking, horseback riding, and OHV use are all available recreation activities. There are 12 tables and a group barbeque area available (BLM 2007h).

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
East Creek Campground	Approximately 12 miles northeast of McGill off of Forest Service Road 427.	X	X	X	X	The East Creek Campground is located in the Duck Creek Basin high on the slopes of the Schell Creek Range in the middle of an Alder, Pinyon and Juniper forest. The campground has seven campsites for both recreational vehicles (RVs) and tents. Hiking is the primary recreational activity (USFS 2007a).
Egan Crest Trailhead	Eight miles west of Ely just off US-50 on the north side.	X	X	X	X	The Egan Crest Trail System provides recreationists with over 50 miles of trails with a variety of terrain from the rolling sagebrush flats to the higher elevations in pinyon and juniper forests. The trailhead has picnic tables, grills, a gravel parking lot, and an information kiosk (BLM 2007h).
Ely Elk Viewing Area	Along US-93 south of Ely and at the viewing area pull-out.	X	X	X	X	The largest herd of elk in Nevada can be observed feeding during the fall and spring seasons. Peak viewing times are October through November, and March through April, with elk sometimes also seen in mid-winter. Other watchable wildlife species in the area include golden eagles, ravens, black-tailed jackrabbits, and chipmunks (Leisure and Sport Review 2007).
Garnet Hill Recreation Area	Located 9.5 miles north of Ely via US-50.	X	X	X	X	This recreation area is an internationally known site for gem collectors looking for garnets. It also provides picnicking and camping opportunities (BLM 2007h).
Goshute Creek Recreation Area	Located in northern Steptoe Valley at the base of the Cherry Creek Range and is approximately 60 miles north of Ely via CR 21.	X	X	X	X	This tiny campground has three primitive campsites and offers hiking, picnicking, hunting, fishing, and camping (BLM 2007h).
Great Basin National Park	Approximately 70 miles east of Ely on US-6/50 to SR-487 and Baker.	X	X	X	X	This 77,000-acre National Park offers both developed and dispersed recreation opportunities. Visitors can experience the 12-mile Wheeler Peak Scenic Drive, camp in four developed campgrounds, one of which is open year-round; explore eight wild caves accessible with a cave permit or take a guided tour of Lehman Caves. The park has two picnic areas, as well as the campground which has areas available for picnicking. Visitation of approximately 80,000 in recent years (Great Basin NP 2008).

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
Illipah Reservoir	Just south of US-50 about 40 miles west of Ely. There is a sign marking the turnoff to Hamilton (ghost town) and Illipah Reservoir.		X			This recreation site is located at the base of the White Pine Range and has a small fishing reservoir. Illipah is a popular spot to fish for rainbow trout and brown trout throughout the year. Ice fishing is a popular activity during the winter. Mountain biking, hiking, horseback riding, and sightseeing are some of the additional activities available in the area. The campground has 14 sites with tent and RV sites available. The campground is approximately 1 mile off of the highway (BLM 2007h).
Meadow Valley	In Lincoln County east of Pioche SR-322 past Ursine.		X			The Meadow Valley Recreation Site main campground lies in a narrow side canyon called Nicanor Canyon in the Mt. Wilson Range, at approximately 5,800-foot elevation. There is a camping area available in the side canyon with approximately six sites. Fishing, hiking, and bird watching are popular in the area. This recreation site borders Spring Valley State Park, which provides additional fishing and hiking opportunities (BLM 2007h).
Pony Express National Historic Trail	The Trail enters Steptoe Valley through Egan Canyon and runs approximately east-west across the BLM Ely District in the project area.	X	X	X	X	The Pony Express National Historic Trail was established as a National Historic Trail by Congress in 1992. The Trail is administered by the National Trails System, Salt Lake City, Utah office, but responsibility for management of the Trail lays in the hands of current trail managers at the federal, state, local, and private levels. Recreational uses of the Trail include hiking, biking, horseback riding, and historic reenactments of the trail experience. Use of the Trail is increasing because of heritage tourism (people rediscovering their past), commemorative activities, and media interest (NPS 2007a).
Ruby Lake NWR	Southeast of the Ruby Mountains, approximately 45 miles northwest of the North Plant Site.	X	X	X	X	This 39,926-acre refuge was formed in 1938. Many tourists visit the mountains and the refuge due to the array of easily accessible habitats and scenic qualities of these areas (USFWS 2007i). Boat launch facilities are available in the NWR. There are no camping facilities and camping is not allowed (Nevada Adventures 2008).

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
South Ruby Campground (a.k.a. Ruby Marsh)	Located 75 miles south of Wells on CR-788.	X	X	X	X	Adjacent to the Ruby Lake NWR. Contains 35 sites in pinyon-juniper woodland, at the base of a steep slope rising to park peak. In addition to camping facilities, the campground has a fish cleaning station (Nevada Adventures 2008).
Success Summit Loop	Links US-50 and US-93 north of Ely and McGill.	X	X	X	X	The graded loop road runs through the Schell Creek Range of the Humboldt-Toiyabe National Forest. Along most of its length the road is at aspen level, providing for scenic views, especially during the fall season.
Timber Creek Campground	Approximately 16 miles northeast of McGill off of Forest Service Road 425	X	X	X	X	The Timber Creek Campground is in a spruce, fir, and aspen forest setting. It has six single sites and six group sites for both RVs and tents. The campground offers concrete pads, fire pits and cooking grills, drinking water, vault toilets, and a playground with a sandbox. Timber Creek is a perennial stream and runs through the middle of the campground. Hiking, nature/wildlife viewing, and horseback riding are the primary recreational activities in this area (USFS 2007a).
Ward Mountain Recreation Area	Approximately 6 miles south of Ely via US-6.	X	X	X	X	There are 20 miles of trails that meander through the sagebrush and pinyon-juniper forests of Ward Mountain. These trails are available for hikers, bikers, skiers, horses, motorcycles, and snowmobiles. This site is jointly administered by the BLM and the USFS (BLM 2007h).
White River Campground	At the base of Currant Mountain near the Currant Mountain Wilderness in the White Pine Mountain Range		X			The White River Campground straddles the White River. The campground is approximately 34 miles southeast of Ely off of Forest Service Road 1163. It has ten sites with fire pits, camping grills, and vault toilets. The primary recreational activities are hiking, sightseeing, wildlife/nature viewing, backpacking, hunting, and all-terrain vehicle/OHV riding (USFS 2007a).

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
STATE						
Cave Lake State Park	Approximately 15 miles southeast of Ely via SR-486.	X	X	X	X	Cave Lake State Park is open year round. The 32-acre reservoir at Cave Lake State Park is popular for trout fishing, crawdadding, boating, picnicking, and camping. The park is located in the Schell Creek Range at an elevation of 7,300 feet, offering scenic views and opportunities for nature study and photography. Facilities include campgrounds, picnic areas, hiking trails, and a boat launch. Winter sports such as ice fishing, cross-country skiing, and ice-skating also are available. Snow sculpting is becoming a popular activity, and the White Pine Fire & Ice Show is the premier winter event in the area (Nevada Division of State Parks 2007a). Total visitation at Cave Lake State Park for 2000 was 76,105. In 2006, the total visitation was 56,322. This represents a general decrease in visitation at the park of 26 percent over the last seven years. By comparison, the decreased visitation trend across all Region V parks was 13 percent (Nevada Division of State Parks 2007b).
Comins Lake	Approximately 10 miles southeast of Ely via US-50/6/93.	X	X	X	X	Originally established by the realignment of US-93 that created a dam, it is fed by both Steptoe and Cave Creeks from the east, and Willow Creek from the south. At capacity, the lake covers 410 surface acres and has a maximum depth of 15 feet. In 1999, the lake and the adjacent 3-C Ranch were purchased by the Nevada Department of Wildlife (NDOW). The lake is now managed to maximize fisheries resources and contains rainbow trout, brown trout, largemouth bass, and northern pike (NDOW 2007d).

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
Ward Charcoal Ovens State Historic Park	Seven miles south of Ely via US-50/6/93, then 11 miles southwest on Cave Valley Road in the Egan Mountain Range.	X	X	X	X	Ward Charcoal Ovens State Historic Park is mostly known for its six beehive-shaped historic charcoal ovens used in the late 19th century to generate charcoal for use in the mines of nearby Ward. The park also offers an array of recreational opportunities including hiking, mountain biking, and ATV riding. Other features include forested woodlands, riparian areas, and views of Steptoe Valley and views of Wheeler Peak, located in the Great Basin National Park (Nevada Division of State Parks 2007). Total visitation at Ward Charcoal Ovens State Historic Park for 2000 was 11,977. In 2006, the total visitation was 4,390. This represents a general decrease in visitation at the park of 37 percent over the last seven years. By comparison, the visitation trend across all Region V parks was down by 13 percent (Nevada Division of State Parks 2007b).
Beaver Dam	Approximately 34 miles east of Caliente adjacent to the Utah border. Motorists can reach the park by driving 6 miles north of Caliente on US-93, then 28 miles east on a graded gravel road that leads to the park entrance		X			Beaver Dam State Park is Eastern Nevada's most remote park. Deep canyons, pinion and juniper forests, a flowing stream and numerous beaver dams are the primary features, offering fishing, camping, picnicking, hiking, photography, and nature study. Facilities include campgrounds, a group use area, a day-use picnic area, and hiking and interpretive trails. Beaver Dam is open year-round weather permitting (Nevada Division of State Parks 2007a). Total visitation at Beaver Dam for 2000 was 8,393. In 2006, the total visitation was 5,939. This represents a general decrease in visitation at the park of 29 percent over the last seven years. By comparison, the visitation trend across all Region V parks decreased by 13 percent (Nevada Division of State Parks 2007b).

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
Cathedral Gorge	Just west of US-93, 2 miles north of Panaca		X			Cathedral Gorge is located in a long, narrow valley where erosion has carved dramatic and unique patterns in the soft bentonite clay. Trails abound for exploring the cave-like formations and cathedral-like spires. Miller Point, a scenic overlook just north of the park entrance on US-93, offers excellent views of the scenic canyon. Shaded picnic areas and a tree-shaded campground area are open all year. Hiking, picnicking, camping, nature study, photography and ranger programs are the most common activities at the park (Nevada Division of State Parks 2007a). Total visitation at Cathedral Gorge for 2000 was 57,167. In 2006, the total visitation was 59,705. This represents a general increase in visitation at the park of 4 percent over the last seven years. By comparison, the visitation trend across all Region V parks decreased by 13 percent (Nevada Division of State Parks 2007b).
Echo Canyon Reservoir	Twelve miles east of Pioche via SR-322 and SR-323		X			Echo Canyon State Park offers a 65-acre reservoir with a campground, picnic area, group use facilities and boat launch. The park is popular for camping, fishing, and hiking (Nevada Division of State Parks 2007a). Total visitation at Echo Canyon Reservoir for 2000 was 49,762. In 2006, the total visitation was 38,118. This represents a general decrease in visitation at the park of 23 percent over the last seven years. By comparison, the visitation trend across all Region V parks decreased by 13 percent (Nevada Division of State Parks 2007b).

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
Kershaw-Ryan State Park	Two miles south of Caliente via US-93 and SR-317.		X			Kershaw-Ryan State Park is situated in a colorful, scenic canyon at the northern limit of Rainbow Canyon. Steep canyon walls tower over a long, narrow valley. Early settlers here cultivated a garden of grape vines, trees, and grassy lawn surrounding a spring-fed pond, providing a sharp contrast to the rugged landscape. In 1984, flash floods destroyed most of the park, requiring its closure. It re-opened again in 1997. A picnic area, restrooms and trails offer visitors nature study, photography, picnicking, and hiking (Nevada Division of State Parks 2007a). Total visitation at Kershaw-Ryan State Park for 2000 was 20,689. In 2006, the total visitation was 28,254. This represents a general increase in visitation at the park of 27 percent over the last seven years. By comparison, the visitation trend across all Region V parks decreased by 13 percent (Nevada Division of State Parks 2007b).
Spring Valley State Park	Twenty miles east of Pioche via SR-322.		X			Spring Valley State Park offers water oriented recreation at the 65 acre Eagle Valley Reservoir. Boat launching, picnicking and camping facilities are available. Other opportunities include hiking, exploring, and touring the historic Ranch House Museum (Nevada Division of State Parks 2007a). Total visitation at Spring Valley for 2000 was 119,959. In 2006, the total visitation was 107,047. This represents a general decrease in visitation at the park of 11 percent over the last seven years. By comparison, the visitation trend across all Region V parks decreased by 13 percent (Nevada Division of State Parks 2007b).
Valley of Fire State Park	In Clark County approximately 6 miles from Lake Mead and 55 miles northeast of Las Vegas via I-15 and on exit 75.		X			Valley of Fire is Nevada's oldest and largest state park, dedicated in 1935. The valley derives its name from the red sandstone formations and the stark beauty of the Mojave Desert. Ancient trees and early man are represented throughout the park by areas of petrified wood and 3,000 year-old Indian petroglyphs. Popular activities include camping, hiking, picnicking and photography. The park offers a full-scale visitor center with extensive interpretive displays. The park is open all year (Nevada Division of State Parks 2007a).

NAME	LOCATION	PROXIMITY (WITHIN 50 MILES)				DESCRIPTION
		PLANT SITES*	ELEC TRANS	WATER SUPPLY	RAIL FACILITIES	
COUNTY						
White Pine County	Various	X	X	X	X	Recreational facilities owned and operated by White Pine County include a golf course, tennis courts, numerous ball parks, six town parks, neighborhood parks, a shooting range, a summer swimming hole, and playgrounds. These facilities are located in the city of Ely and the community of McGill. The County also operates the White Pine County Rodeo Grounds and Fairgrounds north of Ely. Additionally, the city of Ely owns and operates the Ghost Train, which is a tourist train operation along the portion of the NNRy from Keystone to McGill Junction.
MULTI-AGENCY						
Camp Success	The Camp is situated at the south end of Duck Creek Valley and lies at an elevation of nearly 9,000 feet.	X				Camp Success is a facility that is maintained through the joint efforts of White Pine County, the US Forest Service, the Nevada Division of Forestry Honor Camp Program, and volunteers. During the summer, the Camp hosts a variety of events including weddings, reunions, youth groups, outdoor recreation groups, family gatherings, and retreats (White Pine County 2007).
PRIVATE						
Bassett Lake	Approximately 4 miles northwest of McGill off of US-93.	X	X	X	X	Originally established in 1942 as a settling pond for mill tailings from local copper mines, it is now owned by the Kennecott Copper Corporation. At capacity, Bassett Lake covers 77 surface acres and has an average depth of 5 feet. Its primary water source is Tailings Creek. It contains northern pike, largemouth bass, and carp. There is a primitive boat ramp; however, no restrooms or overnight camping facilities exist at the lake (NDOW 2007d).
Various	Various	X	X	X	X	Several private campgrounds and RV parks exist near the project area.

*Includes proposed plant sites, the associated worker villages, and the Mt. Wheeler Transmission Line.
SR – State Route; CR- County Road

3.14.4.4 Rail Facilities

Rail facilities would be within 50 miles of 2 SRMAs and the Ely SRP (**Table 3.14-1**) and 22 developed sites (**Table 3.14-2**). The rail facilities under both the proposed action and its alternative would be located within lands managed as ERMAs and would cross the Pony Express Trail. No SRMAs or SRP areas would be affected by the proposed action or its alternatives.

3.15 Visual Resources

This section describes visual resources in the project area and the BLM's Visual Resource Management (VRM) System, which is used both to describe existing conditions and to assess potential impacts presented in **Chapter 4**. The section also describes the Key Observation Points (KOPs) that were used to describe existing conditions and assess potential impacts of the Proposed Action and Action Alternatives on visual resources.

3.15.1 Area of Analysis

The visual resource project area for the proposed EEC consists of the viewsheds of proposed project facilities. These facilities include the South and North Plant Sites, transmission line corridors, rail and road corridors, and water facilities. Elements of the project extend from near Shafter Siding on the north end to the Harry Allen Substation on the south end, a total distance of approximately 300 miles. The main project area for visual resources encompasses Steptoe Valley and the facing slopes of the mountain ranges on the east and west sides. Also included in the visual project area are locations where proposed transmission lines between the plant sites and the Harry Allen Substation cross major highways.

3.15.2 Data Sources and Methods

The BLM provided existing VRM classifications for the Elko, Southern Nevada, and Ely districts. Information about the quality of the night sky was obtained from on-line sources, as described in **Section 3.15.3.4**. Descriptions of existing visual resources were based on field visits.

The following indicators were considered when describing the affected environment for visual resources:

- Level of visual contrast (related to form, line, color, and texture) between proposed project elements and VRM classes
- Visibility (see **Section 3.6, Air Quality**)
- Light pollution

It should be noted that potential project impacts on visibility and light pollution are separate issues not related to, or analyzed in, the VRM process.

3.15.3 Existing Conditions

3.15.3.1 VRM Classes

The BLM's VRM system provides a means to evaluate the scenic value of an area's visual resources so that the area can be appropriately managed (BLM 1986b; BLM 1986c; BLM 1998b; BLM 1998c). The VRM system can also be used to analyze potential visual impacts and apply visual design techniques to minimize impacts on the landscape. The VRM system consists of an inventory stage and an analysis stage. The inventory stage involves identifying and inventorying visual resources using BLM's visual resource inventory process. The analysis

stage involves rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from representative or selected key travel routes and/or observation points.

A BLM RMP establishes how public lands will be used and managed for different purposes. Visual resources are considered in development of the RMP, and visual resources are assigned one of four VRM classes. Management objectives of the VRM classes are as follows:

- *Class I Objective*. The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- *Class II Objective*. The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- *Class III Objective*. The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- *Class IV Objective*. The objective of this class is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Most of the project elements fall within the boundaries of the BLM's Ely District Office. Project elements north of the White Pine-Elko county line are within the Elko District and project elements south of the Lincoln-Clark county line are within the Southern Nevada District. The Elko and Southern Nevada Districts have assigned VRM classifications to lands administered by the BLM. VRM classifications for the Ely District are from the District RMP, which was recently finalized. The new RMP replaced the Egan Resource Area RMP, the Caliente and Schell Management Framework Plans (MFPs), and incorporated relevant sections from the Caliente Management Framework Plan (MFP) Amendment. **Figures 3.15-1a – 3.15-1c** depict VRM classes for BLM lands in the project area. **Table 3.15-1** lists the study area acreages of project elements on BLM land that fall within the four VRM classifications. Actual project disturbance would likely be less than the study areas shown.

TABLE 3.15-1. VRM CLASS ACRES BY PROJECT COMPONENT STUDY AREAS

PROJECT ELEMENT	VRM CLASS (ACRES)			
	I	II	III	IV
South Plant Site			2,970	
South Plant Site Rail Lead			180	
South Plant Site Alternative Rail Line[1]			111	
Lages Water Line to South Plant Site		166*	1,999	
South Plant Site Worker Village			20	
Mt. Wheeler Transmission Line			252	14
Robinson Summit Substation[2]			410	621
Harry Allen Substation				10
Transmission Line Segment 1A - Alternative		685	3,877	105
Transmission Line Segment 1B			616	4,221
Transmission Line Segment 1C			24	3,534
Transmission Line Segment 1D				6,772
Transmission Line Segment 3 - Alternative			2,078	46
Transmission Line Segment 4A			3,783	
Transmission Line Segment 6C		406	440	37,597
Transmission Line Segment 8				19,482
Transmission Line Segment 9A[3]			940	979
Transmission Line Segment 9B				4,065
Transmission Line Segment 9C				708
Transmission Line Segment 9D			2	6,294
Transmission Line Segment 10 – Alternative (Line 2)		1,284	2,518	1,745
Transmission Line Segment 11			8,099	5,278
Duck Creek Water Line - Alternative		30	120	
Lages Station Well Field	All Private Lands			
North Plant Site Alternative			2,969	
North Plant Site Rail Lead			314	
North Plant Site Alternative Rail Line[4]			584	3,791
Lages Water Line to North Plant Site			734	
North Plant Site Worker Village	All Private Lands			
Total Acres		**2,570**	**33,040**	**95,323**
Percent of Total		**1.96**	**25.23**	**72.81**

[1]Includes only the Alternative Rail Line study are from Shafter to Lages Station and the rail-only line near the South Plant Site. The remainder of the Alternative Rail line is within the Lages Station Water Supply Line.
[2]Includes Transmission Line Segments 1E, 1G, 6A
[3]This number includes both Lines 1 & 2 which would be the Alternative Segment 9A for Line 2. The proposed Transmission Line Segment 9A acreage would be half of this.
[4]Includes the Alternative Rail Line study area from Shafter to the North Plant Site only.
* Includes acreages for Mt. Wheeler Transmission Line and South Plant Site Alternative Rail Line.

3.15.3.2 Key Observation Points

The elements of projects such as the EEC may be visible from a large area and it is impractical to describe the existing visual conditions and potential project impacts from all important viewing areas. To assist in the description of the existing visual environment and in the assessment of potential project impacts, representative viewing areas called KOPs are selected. KOPs are points on a public travel route or from a public use area where the view of the proposed activity would be most revealing. For this analysis, 14 KOPs were selected from throughout the project area (**Figures 3.15-1a – 3.15-1c**). The KOPs and existing visual condition of the landscape seen from each KOP are described below.

KOP 1

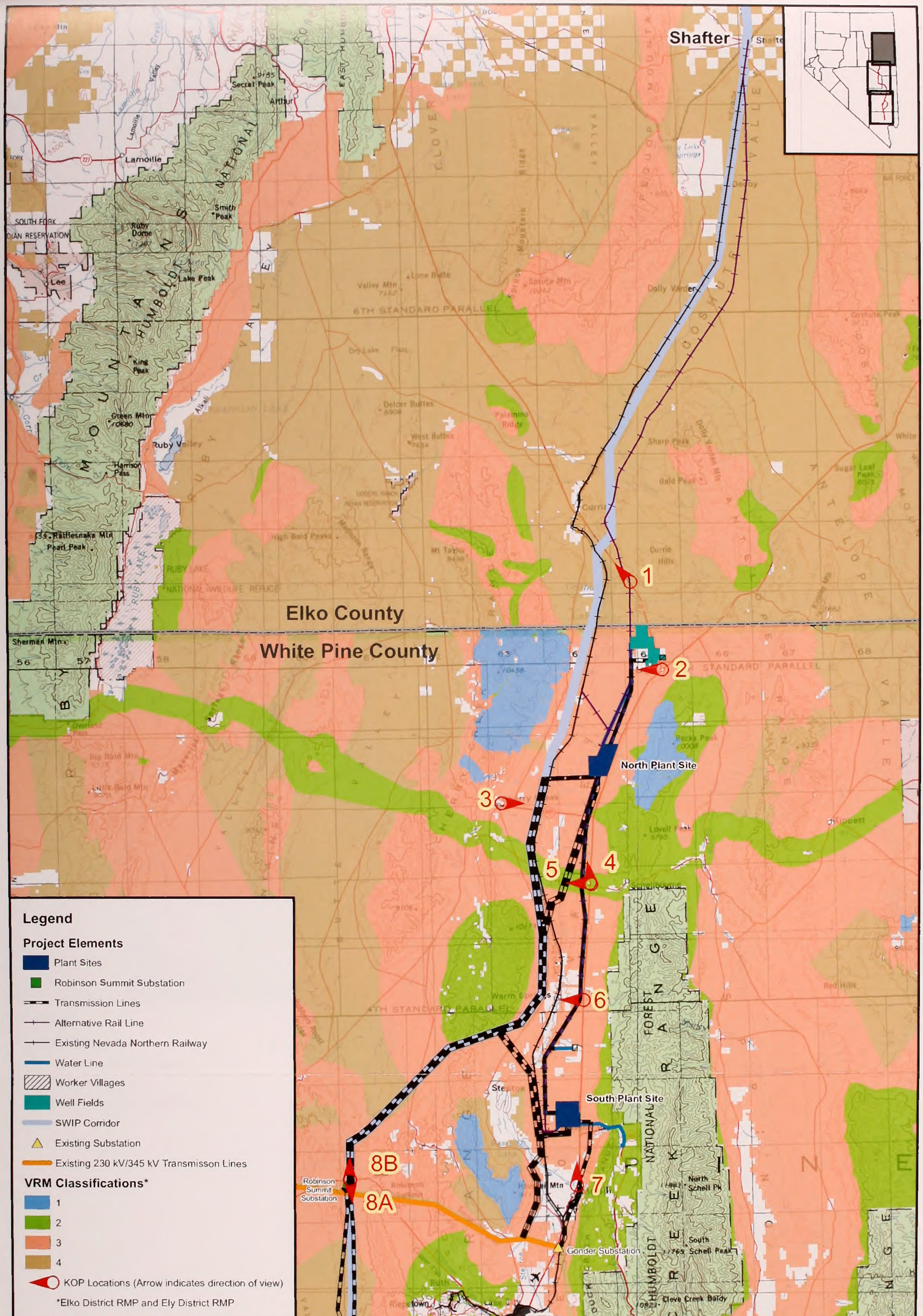
KOP 1 is the northernmost KOP and is located southwest of the Currie Hills on US-93 at the proposed crossing of the Alternative Rail Line. This is the only KOP within the BLM Elko District boundary. The view to the northwest (**Figure 3.15-2**) shows the expanse of the valley with the north end of the Cherry Creek Range and the south end of the Pequop Mountains in the distant background. The highway is the only visible disturbance. On the north side of US-93 the Alternative Rail Line would follow the highway northwest for approximately 1 mile, and then turn north toward Shafter Siding. This portion of the valley is designated VRM Class IV.

KOP 2

Lages Station, the intersection of US-93 and Alternate US-93, is a major highway intersection in Steptoe Valley that connects the towns of Wells and West Wendover with Ely. Project elements in the vicinity include the Alternative Rail Line, Mt. Wheeler Transmission Line, north worker village, and the Lages Station well field and water pipeline. The distance to the Alternative Rail Line, Mt. Wheeler Transmission Line, and the water pipeline is approximately 2.5 miles. Other than a few small buildings on the valley floor, little disturbance is visible (**Figure 3.15-3**). The Cherry Creek Range rises above the valley on the far side. A slight rise to the south of Lages Station blocks the view of the valley to the south. The valley floor west of KOP 2 is designated VRM Class III except for the SWIP Corridor on the far side, which is designated VRM Class IV.

KOP 3

KOP 3 is located on SR-489 on the east side of the town of Cherry Creek. The view to the east from KOP 3 encompasses Steptoe Valley and the Schell Creek Range on the far side (**Figure 3.15-4**). The view is dominated by the State Highway crossing the valley, with little other disturbance visible. Project elements in the vicinity include the North Plant Site and switching station, and Segment 1A (Alternative) of EEC-RS 500-kV transmission lines 1 and 2, which are about 8.4 miles distant. The Alternative Rail Line, Mt. Wheeler Transmission Line, and Lages Station water pipeline are 7.5 miles distant. Segment 1B of EEC-RS 500-kV transmission lines 1 and 2 is approximately 3 miles distant. This portion of the valley floor is designated a mix of VRM Class II, Class III, and Class IV for the SWIP Corridor.



Source - VRM Classifications: Nevada BLM (VRM ROD)
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada, Reno).

1:500,000

10 0 10 Miles

10,000 0 10,000 Meters

Scale is 1:1,500,000 when printed at 11"x17"

FIGURE 3.15-1a
KOPS AND VRM CLASSES
ELY ENERGY CENTER

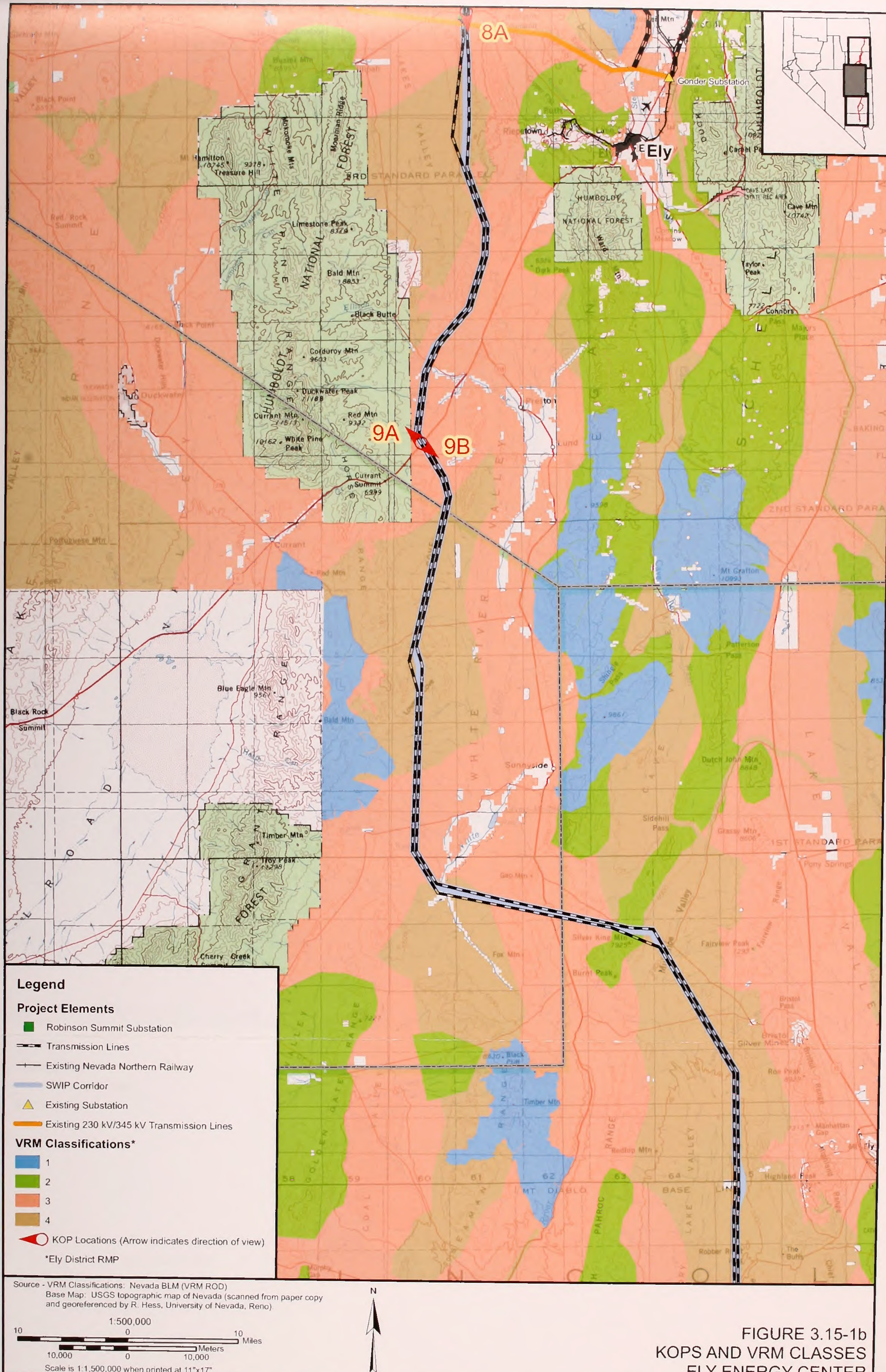
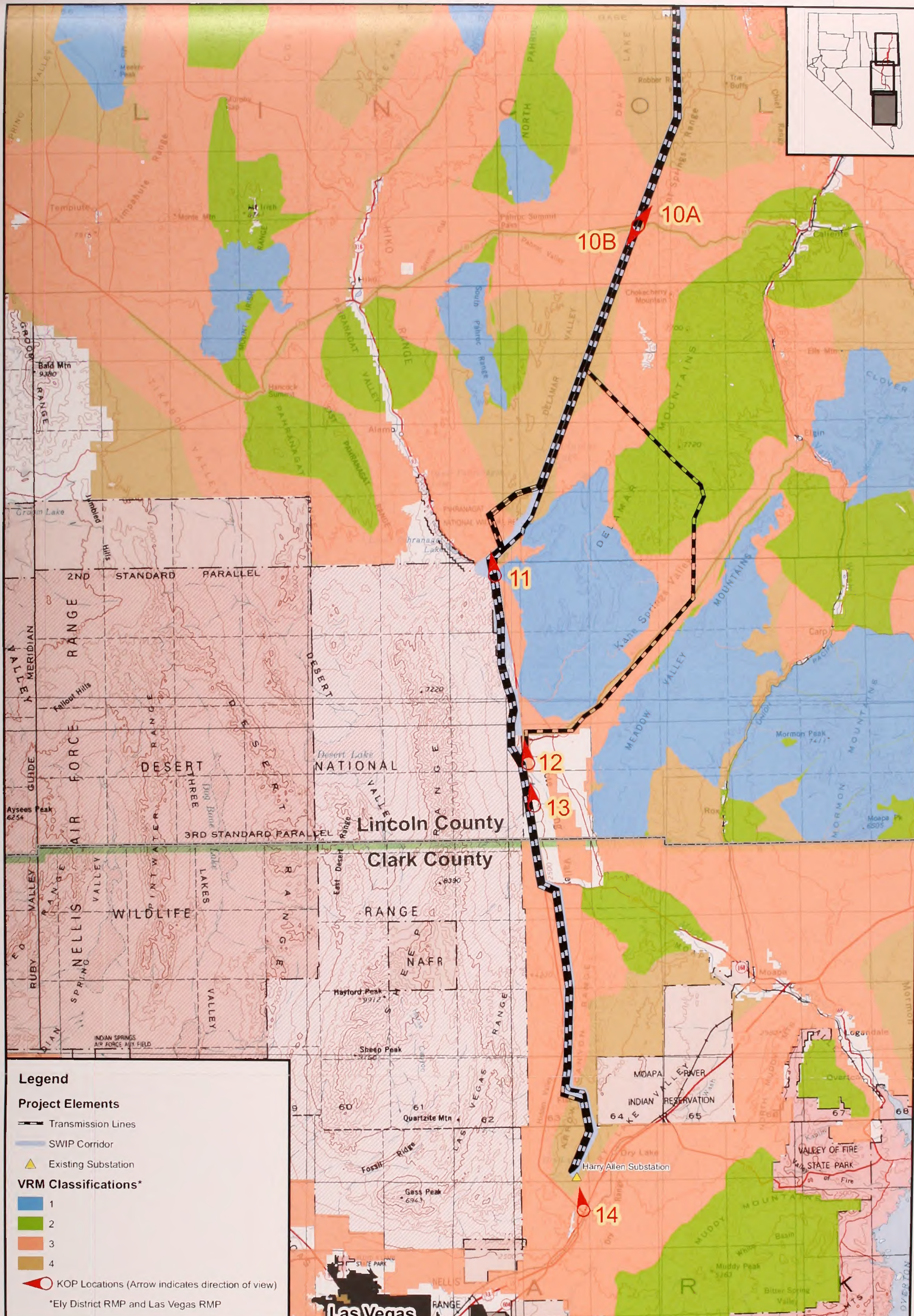


FIGURE 3.15-1b
KOPS AND VRM CLASSES
ELY ENERGY CENTER



Source - VRM Classifications: Nevada BLM (VRM ROD)
Base Map: USGS topographic map of Nevada (scanned from paper copy and georeferenced by R. Hess, University of Nevada, Reno).

1:500,000

10 0 10 Miles

10,000 0 10,000 Meters

Scale is 1:1,500,000 when printed at 11"x17"

FIGURE 3.15-1c
KOPS AND VRM CLASSES
ELY ENERGY CENTER

Figure 3.15-2. View to the northwest from KOP 1

Figure 3.15-3. View to the west from KOP 2

Figure 3.15-4. View to the east from KOP 3

Figure 3.15-5. View to the north from KOP 4

KOP 4 is located at the point where the Pony Express Trail crosses US-93 and includes the view toward the north. Project elements north of KOP 4 include the proposed North Plant Site and switching station in the background zone, the new rail line, Lages Station water pipeline, Mt. Wheeler Transmission Line, and Segments 1A and 1B of EEC-RS 500-kV transmission lines 1 and 2. The plant site and switching station are approximately 10 miles away. The view to the north from KOP 4 is dominated by US-93 and the mountains on both sides of the valley (**Figure 3.15-5**). The valley floor to the north is designated a mix of VRM Class II and Class III.

KOP 5

KOP 5 is located at the point where the Pony Express Trail crosses US-93 and includes the view toward the west. Project elements west of KOP 5 include the Alternative Rail Line, Lages Station water pipeline, Mt. Wheeler Transmission Line, and Segments 1A and 1B of EEC-RS 500-kV transmission lines 1 and 2. The foreground view to the west from KOP 5 is dominated by a dirt road crossing the valley floor (**Figure 3.15-6**). The Egan Range rises behind the valley floor to the west. The land west of KOP 5 in the vicinity of the Pony Express Trail is designated VRM Class II except for the SWIP Corridor, which is designated VRM Class IV.

KOP 6

KOP 6 is on US-93 near Indian Creek (**Figure 3.15-1**) between the North and South Plant Sites. To the west would be the Alternative Rail Line, Lages Station water pipeline, Mt. Wheeler Transmission Line, and Segment 1C of EEC-RS 500-kV transmission lines 1 and 2. The view to the west from KOP 6 is dominated by the wide expanse of the valley, including a dirt road, a few distant buildings, and utility poles. The Egan Range forms a backdrop on the far side of the valley (**Figure 3.15-7**). BLM land on the valley floor west of KOP 6 is designated VRM Class III except for the SWIP Corridor, which is designated VRM Class IV.

KOP 7

KOP 7 is located immediately to the west of the intersection of Avenue R and US-93 on the north end of McGill. The South Plant Site is in the background zone, approximately 7 miles distant. Other project elements in the vicinity include the switching station, the Alternative Rail Line, the NNRy rail lead, the Lages Station water pipeline, alternative Duck Creek water pipeline, Mt. Wheeler Transmission Line, the north end of Segment 3 (alternative) of EEC-RS 345-kV lines 1 and 2, and the south end of Segment 4A of EEC-RS 500-kV Lines 1 and 2. BLM land on the valley floor has been designated VRM Class III. The foreground view to the north from KOP 7 shows the valley floor and wooden telephone and power poles (**Figure 3.15-8**).

Figure 3.15-6. View to the west from KOP 5

Figure 3.15-7. View to the west from KOP 6

Figure 3.15-8. View to the northwest from KOP 7

KOP 8

KOP 8 is on US-50, approximately 3 miles west of Robinson Summit where Segment 1D of the proposed EEC-RS 500-kV Lines 1 and 2 crosses the highway. The north-south transmission line corridor crosses the highway at nearly a right angle. The SWIP Corridor and existing 230 kV/345 kV corridor are designated VRM Class IV; land adjacent to the corridors on both sides of the highway is designated VRM Class III. The Robinson Summit Substation is southwest of the highway crossing. Segments 1E and 6A 500-kV lines 1 and 2 and Segment 1G 500-kV lines 1 and 2 are also south of the highway. The view from KOP 8 to the southwest shows the highway with rolling hills on both sides that limit visibility (**Figure 3.15-9**). The vegetation on the hills is open juniper forest with a shrub understory. The view from the highway to the north is also blocked by the side of a hill (**Figure 3.15-10**). Only a small portion of the Segment 1D of EEC-RS 500-kV transmission lines 1 and 2 would be visible from KOP 8 on the north side of the highway.

KOP 9

KOP 9 is on US-6 about 4 miles northeast of the Nye-White Pine county line where Segment 6C of the proposed RS-HA 500-kV transmission lines 1 and 2 crosses the highway. An angle point just north of the highway allows the crossing to be nearly perpendicular to the highway (**Figure 3.15-1b**). The view to the northwest is an expanse of sagebrush-covered valley floor with juniper forest visible at slightly higher elevations behind (**Figure 3.15-11**). Distant mountains mark the limit of visible features. The view from KOP 9 to the southeast is similar, but the juniper forest cover on the hillside about 2 miles distant is more pronounced (**Figure 3.15-12**). The transmission lines would follow the SWIP Corridor, which is designated VRM Class IV.

KOP 10

KOP 10 is in east Dry Lake Valley on US-93 at the point where Segment 8 of the proposed RS-HA 500-kV transmission lines 1 and 2 crosses the highway. The foreground of the view to the northeast is comprised of the highway, a small utility building, and the valley floor (**Figure 3.15-13**). An existing transmission line, which crosses the highway at this location, recedes into the distance. The view from KOP 10 to the distant southwest is blocked by a hillside, except for a portion of the Burnt Springs Range approximately 1 mile distant (**Figure 3.15-14**). The transmission lines would follow the SWIP Corridor, which is designated VRM Class IV.

KOP 11

KOP 11 is on US-93 just south of the Pahranagat National Wildlife Refuge at the point where Segment 9D of the proposed RS-HA 500-kV transmission lines 1 and/or 2 crosses the highway. In the foreground of the view to the north is the highway, with rocky, sparsely vegetated hills behind (**Figure 3.15-15**). The portion of the transmission lines that would be visible from KOP 11 is within the SWIP Corridor and designated VRM Class IV. The Refuge is not visible from KOP 11.

KOP 12

KOP 12 is located on US-93 near Kane Springs Valley Road where Segment 10 of the proposed RS-HA 500-kV transmission line 2 approaches the highway corridor from the east. The view from KOP 12 to the north-northeast is dominated by the highway and an existing H-frame transmission line support structures on the west side of the highway. The valley floor consists of bare ground and shrubs with mountains visible in the distant background (**Figure 3.15-16**). BLM land along the Segment 10 transmission line corridor in the valley is designated a mix of VRM Class III and Class IV. The Delamar and Meadow Valley mountains, which are located on the north and south sides of Kane Springs Valley, respectively, are designated VRM Class I.

KOP 13

KOP 13 is located on US-93 west of the Meadow Valley Mountains where Segment 11 of the proposed RS-HA 500-kV transmission lines 1 and 2 follows the highway corridor. The view from KOP 13 to the north-northwest is dominated by the highway and an existing H-frame transmission line on the west side of the highway (**Figure 3.15-17**). The valley floor is shrub-covered and relatively featureless; mountains are visible in the far distance. The transmission lines follow the SWIP Corridor, which is designated VRM Class IV.

KOP 14

KOP 14, which is located at the junction of US-93 and I-15, is the only KOP within the BLM Southern Nevada District boundary. Project elements in the area include the Harry Allen Substation, which is approximately 3.5 miles away on the floor of Dry Lake Valley. Segment 11 of the proposed RS-HA 500-kV transmission lines 1 and 2 would enter the switching station on the far side from the northeast. A large number of observers pass this KOP because it is a major intersection on the Interstate Highway just outside Las Vegas. The view from KOP 14 to the north-northwest is dominated in the foreground by the highway and transmission line support structures (**Figure 3.15-18**). Dozens of other support structures are visible in the distance and the mountains of the Arrow Canyon Range form a backdrop. The existing substation appears to be hidden from view by a slight rise in the valley floor. The substation and approximately 8 miles of the transmission line are in BLM land designated VRM Class IV. The transmission line corridor then enters Class III designated land as it continues to the north.

Figure 3.15-9. View to the southwest from KOP 8

Figure 3.15-10. View to the north from KOP 8

Figure 3.15-11. View to the northwest from KOP 9

Figure 3.15-12. View to the southeast from KOP 9

Figure 3.15-13. View to the northeast from KOP 10

Figure 3.15-14. View to the southeast from KOP 10

Figure 3.15-15. View to the north from KOP 11

Figure 3.15-16. View to the north from KOP 12

Figure 3.15-17. View to the north from KOP 13

Figure 3.15-18. View to the northwest from KOP 14

3.15.3.3 Visibility

Potential impacts on visibility depend on the physical interaction of light with particles in the atmosphere as well as human psychophysical processes and value judgments about the inherent beauty of the landscape (Malm 1999). Because effects on humans are subjective and difficult to measure, visibility impacts are generally discussed in terms of existing and potential future levels of dust and gases in the atmosphere that are likely to affect one's ability to see and appreciate distant vistas. A discussion of potential atmospheric effects on visibility is contained in **Section 3.5, Air Resources**.

3.15.3.4 Dark Sky Resource

Exterior lighting associated with new power plant facilities could affect the visual environment. The issue of dark sky preservation is receiving national attention, particularly where National Parks may be affected. The National Park Service has been monitoring night skies at various observation sites, including Great Basin National Park (GBNP), which is approximately 40 miles away. Although night skies at GBNP are among the most pristine measured, lighting in Ely, as well as Salt Lake City and Las Vegas, can be detected at the Park (NPS 2007c).

There is no known baseline available for quality of the night sky in Steptoe Valley. However, satellite measurements of light radiation from the earth's surface can provide a general idea of existing light sources. Archived data collected by the Defense Meteorological Satellite Program (DMSP) is available through the Earth Observation Group at the National Geophysical Data Center (NGDC). The data are available as geo-referenced TIFF format files that can be incorporated into GIS software (NGDC 2007). Satellite data collected in 2003 show that the major light sources in Steptoe Valley are concentrated in the south part of the valley around the town of Ely. Ely is the most intense light source, followed closely by the Ely State Prison, which is located approximately 10 miles northwest of town. The towns of Ruth and McGill can also be detected but their light output is much less intense. No other sources are detectable in the valley, confirming that night skies north of Ely are relatively unpolluted by lighting.

3.15.4 Specific Project Area Conditions

3.15.4.1 Plant Sites

The South and North Plant Sites, as well as portions of other proposed facilities, are located in Steptoe Valley. This north-south trending valley lies between the Schell Creek Range on the east and the Egan and Cherry Creek ranges on the west. The valley is nearly flat in the center with alluvial fans rising slowly to the mountain foothills on both sides. Vegetation in the valley appears gray-green and homogeneous, and consists mostly of sagebrush scrub with an understory of native and non-native grasses. A few bare playas are found at the lowest elevations and these are occasionally covered by water. As the elevation increases toward the foothills, dark green forests of juniper trees become more common, and pine trees become dominant in the mountains. The forests and outcrops of lighter colored bare rock form a mosaic of contrasting colors.

The central portion of Steptoe Valley contains some ranches and residences, including the town of Cherry Creek, but is otherwise undeveloped. The south portion of the valley contains the City of Ely, the Gonder Substation, US-50, and the community of McGill. Mountain ranges dominate the view while the most visible manmade features in the valley include US-93 and various power transmission lines. Because Steptoe Valley remains largely undeveloped, nighttime skies are relatively free of light pollution. The plant sites are within the viewshed of KOPs 3, 4, and 7, as described in **Section 3.15.3.2**.

3.15.4.2 Electric Transmission Facilities

The transmission line alignments proposed to connect the new plant site with switching stations proposed under the different options traverse generally undeveloped and sparsely populated land. The greatest effect on visual resources would occur where the corridors cross major highways where they would be viewed by the greatest number of people. The alignments generally are routed around steep terrain and follow valleys typical of the Basin and Range Province. Major highway crossings include US-50 near Robinson Summit, US-6 near the White Pine County line, US-93 near the Burnt Springs Range, US-93 south of the Pahranagat National Wildlife Refuge, and US-93 near Kane Springs Wash. Electric transmission facilities are within the viewshed of KOPs 2 through 14, as described in **Section 3.15.3.2**.

3.15.4.3 Water Supply Facilities

The Lages Station well field and pipelines, Duck Creek water pipeline, and all of the other well field and pipeline alternatives are situated within Steptoe Valley. Existing conditions in the valley are described above in **Section 3.15.4.1**. Water supply facilities are within the viewshed of KOPs 2 through 6, as described in **Section 3.15.3.2**.

3.15.4.4 Rail Facilities

The Alternative Rail Line would extend from Shafter south through northern Steptoe Valley to one of the proposed plant sites. Rail leads from the existing NNRy to the plant sites are located in the central and south portions of Steptoe Valley. The existing visual character of Steptoe Valley is described above in **Section 3.15.4.1**. Rail facilities are within the viewshed of KOPs 1 through 6, as described in **Section 3.15.3.2**.

3.16 Noise

Noise is an unwanted sound occurrence. A noise's attributes (pitch, loudness, repetitiveness, vibration, variation, duration, and the inability to control the source) determine how it affects a receptor. The study of noise involves three important characterizing parameters: pressure, power, and intensity. The power of an oscillating sound wave is composed of kinetic and potential energies. The intensity of a sound wave is defined as the average rate at which power is transmitted per cross-sectional area in the direction of travel. Noise versus sound is a subjective measurement, thus a receptor's reaction to sound is a poor measurement of noise.

The Federal Noise Control Act of 1972 established a requirement that all federal agencies administer their programs to promote an environment free of noise that jeopardizes public health or welfare. The U.S. Environmental Protection Agency (EPA) was given responsibility for implementing programs to assess noise and identify acceptable noise impacts.

EPA identifies outdoor noise limits to protect against effects on public health and welfare by an equivalent sound level (Leq), which is an A-weighted average measure over a given time. Outdoor limits of 55 dBA Leq have been identified as desirable to protect against speech interference and sleep disturbance for residential areas and areas with educational and healthcare facilities. Sites are generally acceptable to most people if they are exposed to outdoor noise levels of 65 dBA Leq or less, potentially unacceptable if they are exposed to levels of 65 – 75 dBA Leq, and unacceptable if exposed to levels of 75 dBA Leq or greater (EPA 1981).

Generally, natural noise levels will be around 35 dBA in rural areas away from communities and roads. Within a rural community, the man-made noise level ranges from 45 dBA to 52 dBA

(EPA 1981). The day-night sound level, Ldn, (the A-weighted equivalent sound level for a 24 hour period with an additional 10 dB imposed on the equivalent sound levels for night time hours of 10 p.m. to 7 am) in residential areas should not exceed 55 dBA to protect against activity interference and annoyance (EPA 1981). **Table 3.16-1** presents typical sound levels in dBA and subjective descriptions associated with various noise sources.

TABLE 3.16-1. SOUND LEVELS ASSOCIATED WITH ORDINARY NOISE SOURCES

NOISE SOURCE	NOISE LEVEL	SUBJECTIVE DESCRIPTION
Commercial Jet Take-Off	120 dBA	Deafening
Road Construction Jackhammer	100 dBA	Deafening
Busy Urban Street	90 dBA	Very loud
Standard For Hearing Protection 8-Hour Exposure Permissible Exposure Limit (PEL) (MSHA) Action Level within Active Mining Facilities	90 dBA 85 dBA	Very loud Loud - to very loud
Construction Equipment at 50 feet	80-75 dBA	Loud
Freeway Traffic at 50 feet	70 dBA	Loud
Noise Mitigation Level for Residential Areas Federal Housing Administration (FHA)	67 dBA	Loud
Normal Conversation at 6 feet	60 dBA	Moderate
Noise Mitigation Level for Undisturbed Lands (FHA)	57 dBA	Moderate
Typical Office (interior)	50 dBA	Moderate
Typical Residential (interior)	30 dBA	Faint

Source: Federal Highway Administration Highway Construction Noise Handbook.

There are no State of Nevada noise standards directly applicable to the proposed Ely Energy Center. State code gives county and city governments the right to implement noise impact restrictions. No such ordinances apply in the sections of White Pine County where the proposed EEC or associated project components would be located.

3.16.1 Area of Analysis

To properly assess the sound levels affecting any area, an explanation of sound effects, consideration of the topography, climate, flora, and current ambient sound is required. For wildlife, the affected environment for noise impacts is usually limited to a distance of 880 yards (2,640 feet) from the source based on current wildlife studies (Fletcher 1980). However, if residential housing has the potential to be impacted, the affected environment includes the distance from the source of the noise to the residence.

Figure 3.16-1 shows the primary project area including all areas except the distant electrical transmission corridor to the south and the northernmost extent of the rail line corridor to Shafter. Noise sampling locations used to characterize ambient noise levels are also identified on the map.

3.16.2 Data Sources and Methods

Background (ambient) sound levels were recorded in May, 2007 at receptor sites representing locations potentially impacted by noise from the proposed project. Sound measurements were taken using the EXTECH 407780 Integrating Sound Level Meter. This meter meets the ANSI Standard S1.4 for sound level measurements. Measurements were recorded at each site using an A-weighted average measure in decibels (dBA) with a slow time weighting of 1 second. The

duration of the measurements was 15 minutes. Measurements were taken for the equivalent sound level (L_{eq}). Maximum (L_{max}) and minimum (L_{min}) sound levels were also recorded.

3.16.3 Existing Conditions

The primary sources of noise currently observed in the project area are typically associated with natural conditions, especially wind, and transportation impacts, primarily along US-93. Existing noise levels are generally low intensity away from traffic corridors, estimated to average between 30 and 35 dBA. Traffic impacts contribute to only slightly higher background noise levels along smaller or less traveled roadways, but bring noise levels to the 50 to 60 dBA range along US-93 and in urban areas.

Noise generally propagates by line of sight, more strongly with the wind than across or against the wind flow, though strong wind can produce enough noise to drown out other sounds. The thin, dry air associated with higher elevation dry climate areas like Steptoe Valley and surrounding areas enhances noise propagation because higher air pressure and humidity dampen sound transmission. Physical impediments including structures, terrain features, or mountains tend to block or attenuate sound transmission.

Steptoe Valley, and surrounding valleys, would favor sound transmission up and down valley consistent with predominant winds. The valley walls could reflect back sounds initiating nearby, but would generally dampen sounds originating mid-valley or across the valley. The tall valley walls would minimize sound transmission from one valley to the next. Terrain features would also generally minimize noise transmission up side canyons, at least beyond the first significant bend in those canyons. Features in the valley that block line of sight from one point to another, for example the slag piles north of McGill or rises in or rolling terrain, would break up sound transmission enough to lower its volume or change its pitch, or if large enough could more effectively block sound transmission.

Table 3.16-2 below provides the L_{eq}, L_{max}, and L_{min} measurements taken in Steptoe Valley in May 2007 near sensitive receptor sites (see **Figure 3.16-1**).

TABLE 3.16-2. SUMMARY OF A-WEIGHTED MEASUREMENTS AT EACH RECEPTOR SITE

RECEPTOR LOCATION	CONDITIONS	TIME	L_{EQ}	L_{MAX}	L_{MIN}
Site A. Lages Station – junction of US-93 and 93A	Clear, slight breeze (5-10 mph), low traffic (incl. 2 semi trucks)	11 :15a	56.1	80.1	29.8
Site B. approx. 7.5 miles north on US-93 from Lages Station and 50 feet north of road	Clear, slight breeze (5-10 mph), low traffic	11:54a	54.9	74.9	29.3
Site C. Currie – 50 feet north of highway near grocery store	Clear, slight breeze (5-10 mph), low traffic	12:44p	60.1	81.2	29.4
Site D. CR 25/785, approx. 15 miles south of Currie, due west of ranch	Clear, slight breeze (5-10 mph), no traffic	1:45p	35.2	51.3	29.2
Site E. Cherry Creek – next to Museum	Clear, slight breeze (5-10 mph), no traffic	2:22p	42.1	68.0	29.2
Site F. CR 18 (Egan Canyon Road), just south of junction with CR 23 and next to ranch	Clear, slight breeze (10-15 mph), no traffic	3:35p	36.6	49.0	30.2
Site G. Intersection of CR 24 (Monte Neva Rd) and NNRy	Clear, slight breeze (5 mph), no traffic	4:12p	31.5	45.4	29.1
Site H. CR 27 at Steptoe Ranch	Clear, slight breeze (5 - 10 mph), no traffic	5:10p	30.8	55.1	29.3
Site I. Intersection of US-93 and CR 18 (Schellbourne Rd), parking lot of Schellbourne Bar and Cafe	Clear, steady breeze (15 mph), highway noise, moderate traffic	5:45p	59.0	78.7	30.4
Site J. Duck Creek Road, entering basin	Clear, no breeze, no traffic	1:51 p	30.8	49.0	29.2
Site K. Duck Creek Road, in basin near road to Timber Creek campground	Clear, slight breeze (5 - 10 mph), no traffic	2:22p	30.8	45.5	29.3
Site L. McGill residential neighborhood, 4 blocks from US-93	Clear, little breeze, very low traffic	12:53p	40.2	57.3	32.2
Site M. McGill northern gateway into city on US-93	Clear, slight breeze (5-15 mph), highway noise, moderate traffic	1:20p	60.1	82.9	30.3
Site N. US-50 west of Robinson Summit, intersects with SWIP corridor, 100 feet south of highway on gravel road	Clear, no breeze, moderate traffic on highway	11:00a	39.3	57.2	28.7

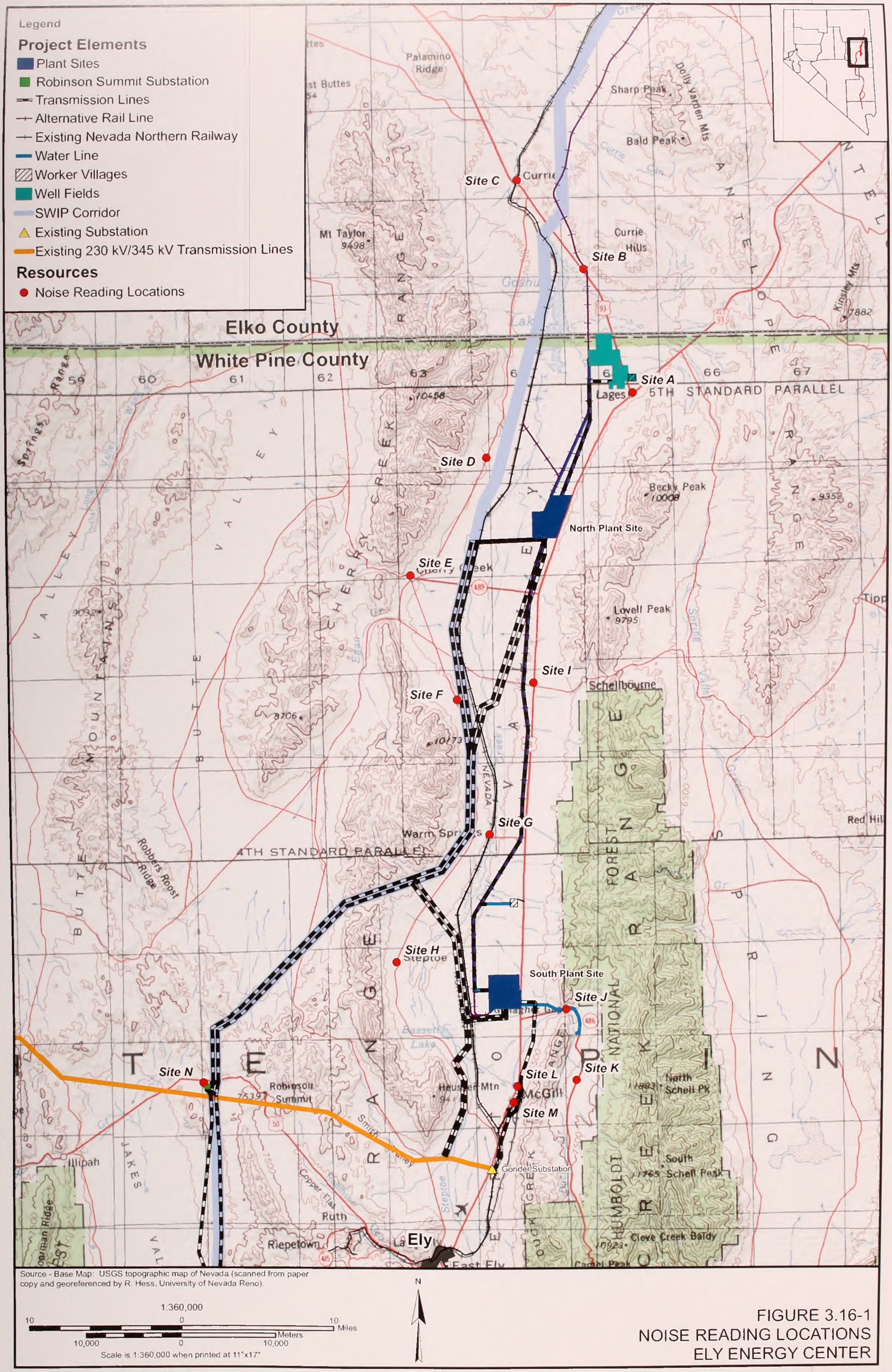


FIGURE 3.16-1
NOISE READING LOCATIONS
ELY ENERGY CENTER

3.16.4 Specific Project Area Conditions

3.16.4.1 Plant Sites

South Plant Site

The closest community to the project site is McGill, approximately 7 miles to the south. The only residences, schools, parks, or other sensitive noise receptors located closer to the energy center site would be the homes in the Schoolhouse Springs neighborhood just north of McGill, and the Steptoe Ranch approximately 5 miles west of the plant site. The terrain in the vicinity features open plains and grasslands conducive to sound transmission. The site is distant from surrounding Steptoe Valley walls, limiting their potential to reflect back noise.

Noise levels measured mid-day in May in McGill ranged from about 40 dBA 4 blocks from US-93 to 60 dBA along US-93. Noise measurements (L_{eq}) at that time at the base of Duck Creek Road near the road to Timber Creek Basin and further up Duck Creek Road showed 31 dBA. Noise levels measured during late afternoon at the Steptoe Ranch the closest residence to the proposed plant site, with a moderate breeze were 33 dBA.

North Plant Site

The closest residences to the project site are the John D Fleming ranch property 4 miles to the west, and the Turner Family Trust ranch land to the northwest. The small communities of Cherry Creek and Lages Station are more than 8 miles away, to the west-southwest and east-northeast respectively. No residences, schools, parks, or other sensitive noise receptors are located any closer to the energy center site. The terrain in the vicinity features open plains and grasslands conducive to sound transmission. The site is distant from west Steptoe Valley walls, but within 3 to 4 miles of the east valley walls allowing some potential for noise to reflect back from that direction across generally unoccupied terrain.

Noise levels (L_{eq}) measured mid-day in May at site D (**Figure 3.16-1**) near the closest ranch residences to the west, and at Cherry Creek ranged from 35 to 42 dBA away from the highway. Noise levels measured along the highway at Lages Station during the same period were 56 dBA.

3.16.4.2 Electric Transmission Facilities

The proposed transmission lines connecting the plant sites to the SWIP Corridor and then south to the Harry Allen Substation in Clark County are at least 1 mile from any occupied residence or area of regular human activity for either generation site, though the routing of the alternative Segment 3 transmission line routing associated with the preferred South Plant Site and the preferred Segment 1B transmission line routing associated with the alternative North Plant Site would each pass within 0.5 mile of a residence or developed area of regular human activity.

Noise levels were measured along US-50 west of Robinson Summit, where it enters the basin providing an estimate of background noise levels south of the proposed EEC sites where a transmission substation is proposed. Noise levels (L_{eq}) measured there mid-day in May were 31 dBA. That site is a local high point that features some localized noise reflection or retention from surrounding terrain, but generally would disperse noise above and away from populated areas. In Steptoe Valley, the transmission lines could run across much of the center or west side of Steptoe Valley. The noise measurements documented in Table 3.15-2 document measured noise levels under 40 dBA L_{eq} away from regular traffic, and ranging from 40 to 60 dBA L_{eq} as nearby traffic volume and speeds increase. Those ranges are believed to be representative of the areas along the transmission line south of Robinson Summit.

3.16.4.3 Water Supply Facilities

The regional noise readings, generally showing 30 to 35 dBA L_{eq} away from traffic, and from 40 to 60 dBA near traffic depending on traffic volume, are representative of background conditions in the vicinity of proposed water development associated with the project. The Duck Creek Valley impoundment site and areas in that valley along the proposed pipeline are near residential neighborhoods that typically have L_{dn} readings ranging between 40 and 55 dBA.

3.16.4.4 Rail Facilities

Sensitive receptors include any residences or businesses along the rail line from the plant sites north to Shafter. The nearest residence to the rail line associated with the Alternative Rail Line is 0.9 miles from the proposed rail corridor. One area of regular human activity, the Schellbourne Café, is slightly closer to the Alternative Rail Line corridor south of the North Plant Site, 0.6 miles to the east. Measured noise levels at three sites north of the EEC locations mid-day in May, 2007 showed 15-minute average L_{eq} reading between 55 and 60 dBA. All three sites were within 50 feet of US-93. All measurements featured clear skies, a 5 to 10 mph breeze, and low to moderate traffic. 31.5 dBA noise levels were measured at the Monte Neva Hot Springs close to the rail lines approximately 7.5 miles north of the South Plant Site in late afternoon. The rail lines are within Steptoe Valley, where open terrain and grasslands allow noise dispersion. In some areas, the rail lines are close enough to the valley walls to allow reflection of noise.

3.17 Socioeconomics

3.17.1 Area of Analysis

The area directly affected by the EEC lies in eastern Nevada and is comprised of Elko, White Pine, Nye, Lincoln, and Clark Counties, Nevada (**Figure 3.17-1**). The power generated by the EEC would help sustain economic growth in Clark County, but the power plant would be located in White Pine County, where it would have an impact on the economy and employment. A railroad serving the facility would be located in Elko and White Pine Counties. Lincoln County lies south of White Pine County and is within commuting distance. It also contains a section of the transmission lines. The only component of the project in Nye County is a section of the transmission lines. The southern terminus of the transmission lines would be located in Clark County. The primary area of socioeconomic effect would be in White Pine, Elko, and Lincoln counties. Effects in Nye and Clark counties would be negligible due to the very limited construction that would occur in those counties. In addition, the economy of Clark County is so much larger than that of the other counties that adding it to the detailed discussion would risk understating the effects to White Pine, Lincoln, and Elko counties.

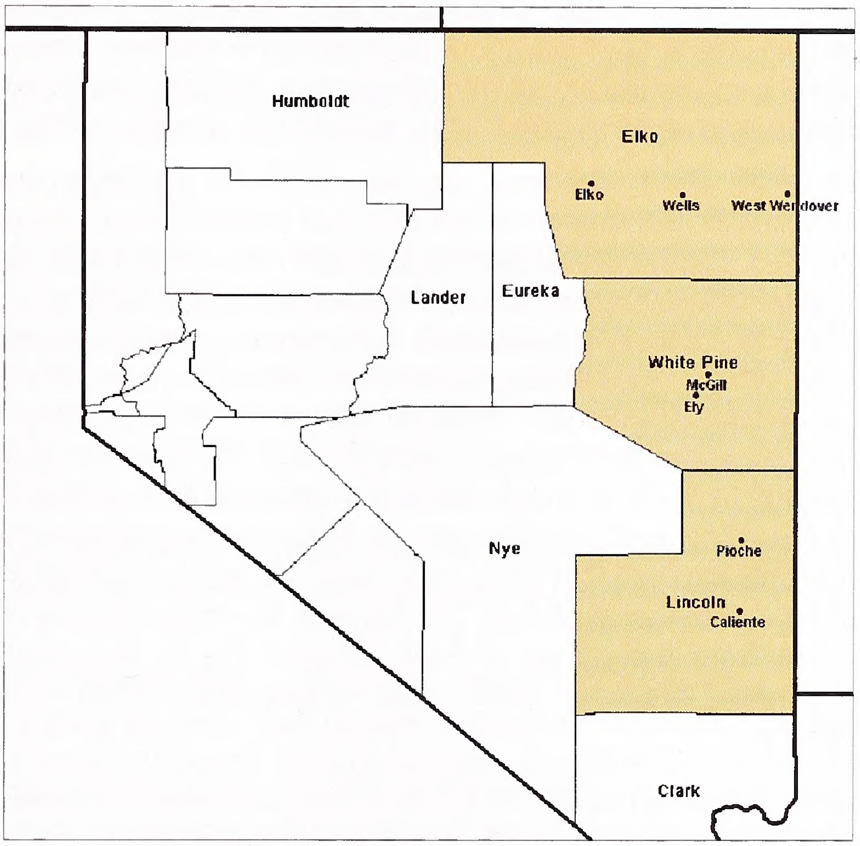
The two proposed sites for the EEC are both located in White Pine County along US-93. The South Plant Site is approximately 20 miles north of Ely, Nevada and 7 miles north of McGill, Nevada. The North Plant Site is approximately 48 miles north of Ely, Nevada and 35 miles north of McGill, Nevada.

3.17.2 Data Sources and Methods

The social and economic factors associated with the EEC are described below. Factors examined include economic setting, population and demographics, employment and income, land ownership, agriculture, housing, community services (education, law enforcement, fire protection, health care, water supply), local government finances, housing, agriculture, and the electric power industry.

Primary published data sources used to characterize this region included the United States Bureau of the Census (2000 a, b, c, and d), the Bureau of Economic Analysis (2007a), state employment agencies, the Western Electricity Coordinating Council (WECC 2006), and the Energy Information Administration (EIA 2006a and b).

Figure 3.17-1. Area Examined for Social and Economic Impacts



3.17.3 Existing Conditions

3.17.3.1 Economic Setting

Elko County

The first persons of European ancestry to pass through Elko County were fur trappers with the Hudson's Bay Company under Peter Skene Ogden. Trappers made numerous trips into northern Nevada throughout the late 1820s until the sparse beaver in the desert climate were trapped out. For the next three decades, present Elko County was traversed by various explorers and emigrants traveling to California and Oregon, but few persons viewed the area as a final destination. The building of the transcontinental railroad in the late 1860s opened the area, and the mining industry began to take root at the same time. Tuscarora began as a gold camp in the late 1860s and produced until the 1930s. Silver chloride ore was discovered at Mountain City in 1869, and after the decline of the gold and silver deposits, copper ore was discovered in the district in the 1930s. Production declined in the 1940s, and Mountain City today mainly serves surrounding ranches. Many of the other cities and towns in Elko County originally owed their existence to the Central Pacific Railroad. The first building lots were sold in the City of Elko in 1869. The large, open spaces in Elko County stimulated cattle and sheep grazing, and the presence of the railroad provided transportation to market. Overgrazing

prompted the State of Nevada to regulate grazing in 1925; in 1934 the Taylor Grazing Act enacted national policy.

The Nevada legislature legalized casino gambling in 1931. The early casinos existed almost exclusively for gambling. The Crumley family owned the Commercial Hotel in Elko, and in 1941 they booked the first entertainers to perform at a Nevada casino, serving as a precursor to the current shows in Las Vegas, Nevada.

The Elko County mining industry began a revival in the 1970s with the advent of low cost open pit mining and heap leaching of gold ores. In recent decades, socioeconomic conditions in Elko County have fluctuated with the local gold mining activity, while ranching continues to influence lifestyles, and gambling and entertainment also anchor the economy (Ellen and Glass 1983; Castleman 1995).

White Pine County

White Pine County has historically been dependent on mining, with ranching playing a secondary role in the area's economy. Several different pioneer trails and the Pony Express traversed the area before permanent settlement occurred. A group of prospectors from Austin, Nevada founded the White Pine Mining District in 1865. Numerous mining camps were established, but most quickly played out. Mining in Ely initially focused on gold and silver, while later investments developed around copper mining. The White Pine Copper Company was capitalized with $500,000 in 1902 and consolidated a group of claims. The Guggenheim family took over the White Pine Copper Company with the Nevada Consolidated Copper Company in 1906. In 1933, Kennecott Copper Company took over the mining operations at Ruth and the concentrator and smelter complex at McGill. The Nevada Northern Railway was built in 1906 as a means to move ore from the mines in Ruth through Ely to the smelter in McGill. The concentrator and smelter products were then transported north from McGill to the Transcontinental Railroad.

While mining has been the backbone of the White Pine County economy, agriculture developed to supply the mining camps and sustained the area during downturns in mining. The primary agricultural activity has been grazing, although at various times hay, potatoes, and grain have been grown. The relatively high elevation of east-central Nevada (Ely is at an elevation of 6,435 feet) precluded growing fruit and tender vegetables. With large amounts of open land, ranching continues to be part of the White Pine County economy (Ellen and Glass 1983; Castleman 1995).

In 1978, falling copper prices coupled with overseas copper production and tighter environmental regulations lead to Kennecott closing the copper mine and significantly cutting employment at the smelter. Layoffs continued until the smelter closed in 1982, and freight service on the NNRy was curtailed in 1983. The closure of the Kennecott copper operations resulted in decreasing population, high unemployment, closure of businesses, and loss of tax revenues. Prior to 1978, the Kennecott operations in White Pine County were responsible for 20 percent of Nevada's total net proceeds of mines tax. After the closure of the copper operations, White Pine County generated only 2 percent of the net proceeds of mines tax in Nevada. The area's economy continued to decline during the mid 1980s although there was a slight upturn in tourism and a small amount of oil and gas exploration.

Rising metal prices during the late 1980s resulted in an upturn in the White Pine County economy. Mining employment reached almost 1,100 with 13 active mines in the area. Alta Gold employed over 600 persons at its East Robinson project. During this time, the state constructed a prison near Ely and hired 370 persons. The mining boom resulted in high wages in the area

and made it difficult for other businesses to attract workers. In the early 1990s, the mining industry experienced another downturn and White Pine County lost 700 mining jobs between 1989 and 1992. Local businesses experienced a 10 to 20 percent decline in taxable sales. By 1994, the unemployment rate in White Pine County reached 12.8 percent as unemployed miners remained in the area while waiting for Magma Nevada Mining Company to receive permits to reopen the Robinson operation. Magma commenced construction at the Robinson operation in 1995 and employed a temporary workforce of 750. As a result, housing was in short supply in Ely and workers stayed in local hotels and motels. The mine started production in 1996, and Magma was subsequently purchased by BHP Minerals of Australia (BHP). The reopening of the Robinson project and several other mines in the area resulted in a labor shortage; the state prison near Ely continually reported 50 to 70 job openings.

World copper prices declined in 1998, and on June 28, 1999, BHP announced that the Robinson operation was being placed in "Care and Maintenance" status and laid-off 433 of the mine's 450 workers. Simultaneously, Alta Gold declared bankruptcy and closed two mines in White Pine County. The mine closures represented 13 percent of the labor force in White Pine County and 24 percent of the annual payroll. School enrollments dropped by 12 percent, and taxable sales in White Pine County declined by 37 percent. The value of new homes constructed for the BHP workforce also dropped by 27 percent. Declining tax revenues severely impacted government services, forcing layoffs of government employees and curtailment of nonessential services such as recreation and libraries.

As housing prices in White Pine County declined, the housing market became more active. Homes were purchased for retirement and as second homes, primarily by residents of Clark County, Nevada.

The energy crisis in California during 2000 drew interest to White Pine County as the possible site of electric generating stations. The County entered discussions with both Pacific Gas and Electric and Duke Energy. Although both companies dropped development plans by 2002, the area's economy started to rebound with small manufacturing plants moving to White Pine County. Housing prices doubled over their 1999-2000 values, and real estate agents noted a lack of housing stock. At the end of 2003, LS Power Development of St. Louis, Missouri expressed interest in White Pine County as the site of a coal-fired power plant. White Pine County entered into a development agreement with LS Power in February, 2004 and the company commenced with permitting of the plant. In early 2006, Sierra Pacific Resources and Nevada Power Company announced plans to construct the EEC in White Pine County.

Mining continues to be important to the local economy. Quadra Mining of Vancouver, British Columbia purchased the Robinson Pit from BHP in April, 2004 and within a year was at full production with 500 employees (White Pine County 2006).

Lincoln County

Lincoln County was settled by the incongruous mix of miners and settlers from Utah who were members of the Church of Jesus Christ of Latter-day Saints (LDS). With the exception of the 1849 Death Valley Jayhawkers, few persons of European ancestry visited the area until a group of LDS missionaries visited in 1857. They engaged in farming in Meadow Valley until called back to present-day Utah the next year. In 1864, mining commenced for silver in the Meadow Valley Mining District. During the same year, members of the LDS church settled Panaca and Eagle Valley. Ore was discovered at Pioche during the 1860s and Pioche was declared the county seat. The county issued $25,000 worth of bonds to construct a courthouse, but county revenues sufficient to service the debt did not develop. The county was forced to issue scrip in

lieu of cash for salaries and other expenses to service the courthouse debt. During the 1880s and 1890s, the county was forced to suspend public schools due to lack of funds. The original bonds for $25,000 were eventually paid off in 1938 at a total cost of $800,000.

Pioche suffered the boom-bust cycles typical to mining towns. Electric power from Hoover Dam arrived during the 1930s. Low-cost power coupled with demand for minerals developed by World War II resulted in the area's mines reopening during the war. There was a similar mining boom during the Korean War. Caliente, the only incorporated city in the county, originated as a division point on the Union Pacific Railroad on the line from Salt Lake City to Las Vegas and Los Angeles. In contrast to the often haphazard development of mining towns, Caliente was planned and has always had an orderly atmosphere (Ellen and Glass 1983; Castleman 1995). While Lincoln County has had a stable economy for the past several decades, the recent development of Coyote Springs may drastically alter the county's future. Coyote Springs is a 65-square-mile, unincorporated master-planned community being developed on the Clark County-Lincoln County line. About two-thirds of the development is in Lincoln County and one-third in Clark County, although the initial development is occurring in Clark County. The project was announced in 1998, and construction of the first golf course commenced in 2005. An official groundbreaking was held in July of 2006. The plans call for an eventual population of 150,000 persons after a 25 to 50 year build out (Reid 2006).

3.17.3.2 Population and Demographics

Elko County is the most populous of the three counties (**Table 3.17-1**). In 2006, Elko County contained 77.2 percent of the estimated population for the three counties. The three counties combined were responsible for 2.4 percent of the population of Nevada. From 1990 to 2006, Elko County population grew at an annualized average rate of 2.0 percent. During the same time period, Lincoln County grew at an annualized average rate of 1.4 percent while population in White Pine County declined at an annualized average rate of 0.15 percent.

TABLE 3.17-1. POPULATION IN THE THREE-COUNTY AREA

	1990	1995	2000	2005	2006
State of Nevada	1,220,695	1,581,578	2,018,456	2,412,301	2,495,529
Elko County	34,142	41,363	45,295	46,046	47,144
Lincoln County	3,810	3,881	4,178	4,517	4,738
White Pine County	9,374	9,743	9,042	8,919	9,150
Total	47,326	55,987	58,515	59,482	61,032

Source: U.S. Bureau of the Census (2000 a, b, and c). Note: Mid-year estimates are made as of July 1 and vary from the decennial census counts which are as of April 1.

The population of Elko County is concentrated in the city of Elko and the nearby area of Spring Creek. Elko had a 2000 population of 16,708 and Spring Creek had a population of 10,548. Collectively, they accounted for 60.2 percent of the Elko County population. Other cities in Elko County are Carlin (2,161), Wells (1,346) and West Wendover (4,721) (Bureau of the Census 2000a). The concentration of population in Elko City results in 53 percent of the County's population living in urban areas (**Table 3.17-2**).

Of the 4,738 persons residing in Lincoln County, 1,123 live in the city of Caliente (Bureau of the Census 2000b). All of Lincoln County is considered rural by the U.S. Bureau of the Census (**Table 3.17-2**).

The population center of White Pine County is Ely, with a 2000 population of 4,041 or 44.0 percent of the County's population. McGill, the area nearest the site of the EEC had a 2000

population of 1,054 (Bureau of the Census 2000c). The population of White Pine County is almost 50 percent urban as a result of the population being concentrated in Ely (**Table 3.17-2**).

TABLE 3.17-2. GENERAL URBAN AND RURAL POPULATION

	STATE OF NEVADA	ELKO COUNTY, NV	LINCOLN COUNTY, NV	WHITE PINE COUNTY, NV
Population	1,998,257	45,291	4,561	9,181
Urban	91.5%	53.0%	0.0%	47.4%
Rural	8.5%	47.0%	100.0%	52.6%

Source: Bureau of the Census (2000d)

The Nevada State Demographer's Office also prepares annual population estimates for counties, cities, and selected unincorporated areas in Nevada, as listed in **Table 3.17.3**.

TABLE 3.17-3. DETAILED URBAN AND RURAL POPULATIONS (2006 ESTIMATE)

COUNTY	INCORPORATED CITIES	POPULATION
Elko County	**Population 48,339**	
	Carlin	2,281
	Elko	18,183
	Wells	1,449
	West Wendover	4,871
Unincorporated Areas		
	Jackpot	1,293
	Montello	175
	Mountain City	125
Lincoln County	**Population 3,987**	
Incorporated City		
	Caliente	1,002
Unincorporated Areas		
	Alamo	432
	Panaca	558
	Pioche	703
White Pine County	**Population 9,542**	
Incorporated City		
	Ely	4,325
Unincorporated Areas		
	Lund	162
	McGill	1,145
	Ruth	405

Source: Nevada State Demographers Office (2007)

Population projections by the Nevada State Demographers Office for the three counties show a decrease in the population of Elko and White Pine Counties over the next 18 years (**Table 3.17-4**). Lincoln County should grow by about 1,100 persons over the same time period. These projections are forecast from historical data, trends and known developments at the time the projections were made (Nevada State Demographers Office 2006). In White Pine and Elko Counties this approach will predict population trends based on mining economies rather than taking changing and emerging economic conditions into account. Population projections assume, among other things, that no major changes will occur, and, as such, they represent a cumulative no action projection. As an idea of the variability of population projections, the U.S.

Census Bureau projection for the July 1, 2025 population of Nevada is 3,863,298, which is 10.4 percent lower than the state's projection of 4,315,334 (Bureau of the Census 2008). The U.S. Bureau of the Census does not provide projections for counties.

TABLE 3.17-4. POPULATION PROJECTIONS TO 2025

DESCRIPTION	2010	2015	2020	2025
State of Nevada	3,087,428	3,605,713	4,001,520	4,315,334
Elko County	46,139	44,560	41,877	41,998
Lincoln County	4,754	5,330	5,694	5,875
White Pine County	9,217	9,423	9,149	8,666

Source: Nevada State Demographers Office (2007).

Nevada is projected to grow to more than 4.3 million persons by 2024, an increase of 73 percent from the 2006 population estimate of just under 2.5 million.

The three counties are relatively uniform demographically (**Table 3.17-5**). White Pine County is 86.3 percent white and the second largest racial group is black accounting for 4.1 percent of the population. Lincoln County is over 90 percent white with the second most commonly cited category two or more races. Elko County is 82 percent white and Native Americans account for 5.3 percent of the population. Hispanics, who may be of any race, comprise 11 percent of White Pine County, 19.7 percent of Elko County, and 5.3 percent of Lincoln County. As is common in western mining areas, a variety of ethnic groups immigrated to White Pine County during the late 1800s and early 1900s. Primary ethnic groups were Basque, Slavic, Greek, Italian, Japanese and Chinese. Language barriers separated groups, and neighborhoods in McGill received names such as Greek Town and Slav Town.

TABLE 3.17-5. RACE AND ETHNICITY IN THE THREE-COUNTY AREA, 2000

	STATE OF NEVADA	ELKO COUNTY, NV	LINCOLN COUNTY, NV	WHITE PINE COUNTY, NV
Population	1,998,257	45,291	4,165	9,181
White	75.2 %	82.0%	91.3%	86.3%
Black	6.8%	4.5%	1.8%	4.1%
Native American	1.3%	5.3%	1.8%	3.3%
Asian	4.5%	0.4%	0.3%	0.8%
Pacific Islander	0.4%	0.1%	0.0%	0.2%
Some Other Race	8.0%	4.5%	2.7%	3.1%
Two of More Races	3.8%	2.8%	1.9%	2.1%
Hispanic, Origin of Any Race	19.8%	19.7%	5.3%	11.0%

Source: Bureau of Census (2000e). The Bureau of the Census reports Hispanic as an ethnicity, not a race. The percentages reported here are relative to the total population numbers for the seven census groups, and should not be added to the total.

The majority of the households in the three counties are family households (**Table 3.17-6**). The Bureau of the Census defines a family as consisting of a householder and one or more other people living in the same household who are related to the householder by birth, marriage, or adoption. Households that consist of a group of unrelated people or one person living alone are considered non-family households. Both Lincoln and White Pine Counties have slightly less than the state average of 66.3 percent family households, while in Elko County 73.5 percent of the households are family households. Similarly, in both Lincoln and White Pine Counties, the average household size is less than the state average of 2.62 persons per household while the Elko County average household is slightly larger than the state average of 2.62 percent (**Table 3.17-6**). These differences may be attributed to people living in institutions (e.g., correctional

institutions, nursing homes, or dormitories); variation in age distribution (e.g., widows or widowers among older populations); or other factors (Simmons and O'Neill 2001).

TABLE 3.17-6. HOUSEHOLD TYPE, 2000

	STATE OF NEVADA	ELKO COUNTY, NV	LINCOLN COUNTY, NV	WHITE PINE COUNTY, NV
Households	751,165	15,638	1,540	3,282
Family Households	66.3%	73.5%	65.6%	65.8%
Non-family Households	33.7%	26.5%	34.4%	34.2%
Persons/Household	2.62	2.85	2.48	2.42

Source: Bureau of the Census (2000f).

3.17.3.3 Employment and Income

Unemployment in the three subject counties has trended downward since the mid-1990s (**Table 3.17-7**). Total employment in Elko County increased from 21,131 in 1995 to 23,987 in 2006 and the unemployment rate dropped from 6.0 to 3.5 percent. Similarly, total employment in Lincoln County increased from 1,318 in 1995 to 1,544 in 2006 while the unemployment rate dropped from 6.0 percent in 1995 to 4.6 percent in 2006. Total employment in White Pine County initially dropped from 4,337 in 1995 to 3,769 in 2000 before rebounding to 4,320 in 2006. The high unemployment rates in the mid 1990s coincide with a downturn in the Nevada mining industry at the time due to the low price of gold. The price of gold averaged $385.50 per ounce during 1995, compared to the price for a period in 2008 of over $900 per ounce.

TABLE 3.17-7. LABOR FORCE AND UNEMPLOYMENT SELECTED YEARS

DESCRIPTION	1995	2000	2004	2005	2006
STATE OF NEVADA					
Civilian Labor Force	852,622	1,062,845	1,188,629	1,229,708	1,295,085
Employment	805,286	1,015,221	1,134,550	1,178,072	1,240,868
Unemployment	47,336	45,624	54,079	51,636	54,217
Unemployment Rate	5.6%	4.5%	4.5%	4.2%	4.2%
ELKO COUNTY, NEVADA					
Civilian Labor Force	21,131	24,209	23,028	23,551	24,867
Employment	19,862	23,257	22,036	22,635	23,987
Unemployment	1,369	952	992	916	880
Unemployment Rate	6.0%	3.9%	4.3%	3.9%	3.5%
LINCOLN COUNTY, NEVADA					
Civilian Labor Force	1,318	1,655	1,580	1,552	1,618
Employment	1,157	1,573	1,490	1,473	1,544
Unemployment	161	82	90	79	74
Unemployment Rate	12.2%	5.0%	5.7%	5.1%	4.6%
WHITE PINE COUNTY, NEVADA					
Civilian Labor Force	4,337	3,769	3,963	4,300	4,491
Employment	4,053	3,611	3,796	4,120	4,320
Unemployment	284	158	167	180	171
Unemployment Rate	6.5%	4.2%	4.2%	4.2%	3.8%
THREE COUNTY AREA					
Civilian Labor Force	26,786	29,633	28,571	29,403	30,976
Employment	25,072	28,441	27,322	28,228	29,851
Unemployment	1,814	1,192	1,249	1,175	1,125
Unemployment Rate	6.8%	4.0%	4.4%	4.0%	3.6%

Source: U.S. Department of Labor, Bureau of Labor Statistics (2007a), www.bls.gov.

Over the past few decades, changes in employment by industry for the three counties over the past several decades indicate that the economic structure of the area is changing (**Table 3.17-**

8). While employment rose by more than 140 percent, from 12,448 in 1970 to 30,265 in 2000, not all industrial sectors participated equally. Mining accounted for 11.2 percent of all employment in 1970, but by 2000 had dropped to 5.5 percent of employment in the three counties. This drop in employment share occurred despite an absolute rise in mining employment from 1,400 persons in 1970 to 1,654 in 2000. The services sector greatly increased in importance in the three counties from 2,603 in 1970 to 10,931 in 2000. Total employment in this sector rose by 350 percent from 1970 to 2000. Over 90 percent of the service sector jobs in the three counties are in Elko County.

TABLE 3.17-8. EMPLOYMENT BY INDUSTRIAL SECTOR IN THE THREE-COUNTY AREA, 1970-2000

EMPLOYMENT BY INDUSTRY				
	1970	**1980**	**1990**	**2000**
Total Full-time and Part-time Employment	12,448	16,717	26,948	30,265
Wage and Salary Employment	10,346	14,246	22,966	25,920
Proprietor's Employment	2,102	2,471	3,982	4,345
Farm Employment	512	1,306	1,338	1,120
Mining	1,400	1,126	2,325	1,654
Construction	436	1,177	1,720	1,686
Manufacturing	470	579	255	349
Transportation and Public Utilities	817	1,066	929	1,055
Wholesale Trade	241[1]	305	907[1]	766[2]
Retail Trade	2,209	2,750	3,980	4,585
Finance, Insurance and Real Estate	484	738	1,111	1,369
Services	2,603	4,566	8,457[1]	10,931[1]
Government	2,421	3,017	4,531	5,788
EMPLOYMENT BY INDUSTRY, PERCENT				
	1970	**1980**	**1990**	**2000**
Total Full-time and Part-time Employment	100.0	100.0	100.0	100.0
Wage and Salary Employment	83.1	85.2	85.2	85.6
Proprietor's Employment	16.9	14.8	14.8	14.4
Farm Employment	10.5	7.8	5.0	3.7
Mining	11.2	6.7	8.6	5.5
Construction	3.5	7.0	6.4	5.6
Manufacturing	3.8	3.5	0.9	1.2
Transportation and Public Utilities	6.6	6.4	3.4	3.5
Wholesale Trade	1.9[1]	1.8	3.4[1]	2.5[2]
Retail Trade	17.7	16.5	14.8	15.1
Finance, Insurance and Real Estate	3.9	4.4	4.1	4.5
Services	20.9	27.3	31.4[1]	36.1[1]
Government	19.4	18.0	16.8	19.1

[1]Does not include Lincoln County. Missing data are suppressed to protect individual company data.
[2] Does not include Lincoln or White Pine Counties. Missing data are suppressed to protect individual company data.
Notes: May not sum to the total due to exclusion of several minor categories. Industry aggregations are based on the Standard Industrial Classification System (SICS).
Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (2007a) www.bea.gov/regional/.

Currently, government is a major employer in each of the three counties (**Table 3.17-9**). Government accounts for 16.4 percent of employment in Elko County, 31.6 percent of employment in Lincoln County, and 33.2 percent of employment in White Pine County.

Other industrial sectors that account for significant portions of employment in Elko County are accommodations/ food services (27.3 percent), retail trade (10.2 percent), construction (6.2 percent), and mining (6.1 percent).

Much of the employment by industry data is suppressed in Lincoln County to prevent disclosure of individual company data. Available data show that, after government, the largest industrial sector is retail trade with 13.2 percent of total employment.

The largest industrial sector in White Pine County, as measured by employment, is accommodations/food service which employs 12.0 percent of the county's workers. Retail trade is responsible for 11.4 percent of employment in White Pine County.

TABLE 3.17-9. EMPLOYMENT BY INDUSTRIAL SECTOR IN THE THREE-COUNTY AREA, 2005

INDUSTRY	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
Total employment	23,185	1,946	4,403
Wage and Salary Employment	20,173	1,353	3,459
Proprietors Employment	3,012	593	944
Farm Employment	741	147	179
Forestry, fishing, and other	D	D	D
Mining	1,422	D	335
Utilities	126	D	D
Construction	1,436	D	25
Manufacturing	223	D	51
Wholesale Trade	646	D	58
Retail Trade	2,370	258	502
Transportation and Warehousing	616	58	D
Information	229	D	37
Finance and Insurance	522	D	95
Real Estate and Rental and Leasing	D	D	100
Professional and Technical Services	601	D	D
Management of Companies and Enterprises	43	L	D
Administrative and Waste Services	724	38	139
Educational Services	92	L	D
Health Care and Social Assistance	1,210	50	D
Arts, Entertainment, and Recreation	379	D	43
Accommodation and Food Services	6,328	D	529
Other Service, Except Public Administration	997	D	146
Government	3,795	615	1,463

D: Not disclosed to avoid revealing individual company data. L: Less than 10 jobs, but the estimates for this item are included in the totals.

Notes: May not necessarily agree with data reported by state employment agencies. Industry aggregations are based on the North American Industry Classification System (NAICS).

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (2007a), www.bea.gov/regional/.

Major employers in Elko County are the Elko County School District, Cactus Petes, Inc., Rainbow Hotel and Casino, Peppermill Hotel Casino, Montego Bay Casino, Queenstake Resources, State Line Nugget Hotel & Gambling Hall, Elko County Government, Elko Red Lion Casino, Wal-Mart Supercenter, Great Basin College, Club 93, Inc., Northeastern Nevada Regional Hospital, and Newmont Midas Mining (Nevada Department of Employment, Training and Rehabilitation 2007).

Major employers in Lincoln County are Computer Sciences Corp., Lincoln County School District, Lincoln County Government, Nevada Division of Child and Family Services, and Grover C. Dils Medical Center (Nevada Department of Employment, Training and Rehabilitation 2007).

Major employers in White Pine County are Robinson Nevada Mining Company, Nevada Department of Corrections, White Pine County School District, William Bee Ririe Hospital, Bald Mountain Mine, Nevada Hotel and Gambling Hall, White Pine County Government and the Bureau of Land Management (Nevada Department of Employment, Training, and Rehabilitation 2007).

White Pine County has the highest average annual wage of the subject counties (**Table 3.17-10**). From 2000 to 2005, White Pine County's average annual nonagricultural wage increased at an annual rate of 4.3 percent. The average annual wage in Elko and Lincoln Counties increased at 4.6 percent and 0.8 percent, respectively.

TABLE 3.17-10. PERSONAL INCOME IN THE THREE-COUNTY AREA, SELECTED YEARS

DESCRIPTION	2000	2002	2003	2004	2005
Average Annual Wage ($)					
State of Nevada	32,276	33,993	35,329	37,106	38,763
Elko County, NV	28,042	29,573	30,457	32,133	33,531
Lincoln County, NV	31,192	35,329	31,616	32,638	32,242
White Pine County, NV	29,133	30,522	30,837	33,277	34,583
Nonagricultural Payroll ($ 1,000)					
State of Nevada	32,853,744	35,523,581	38,144,531	42,514,605	47,127,201
Elko County, NV	555,110	540,938	555,449	608,701	667,566
Lincoln County, NV	42,382	49,167	38,969	40,512	40,856
White Pine County, NV	91,587	95,339	93,699	112,195	131,106
Total Personal Income ($ 1,000)					
State of Nevada	61,427,864	66,632,084	71,183,270	79,353,276	86,224,092
Elko County, NV	1,114,625	1,117,832	1,170,459	1,269,993	1,373,054
Lincoln County, NV	77,548	83,314	86,753	97,011	100,053
White Pine County, NV	219,655	220,126	226,586	260,927	291,403
Per Capita Personal Income ($)					
State of Nevada	30,433	30,717	31,762	34,021	35,744
Elko County, NV	24,608	25,064	26,524	28,562	30,127
Lincoln County, NV	18,561	19,687	20,307	22,441	22,150
White Pine County, NV	24,293	25,478	26,526	30,582	32,672

Source: U.S. Department of Labor, Bureau of Labor Statistics, U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (2007a), www.bea.gov/regional/.

Elko County has the highest median household income, followed by White Pine County and Lincoln County (**Table 3.17-11**). Similarly, Lincoln County has the fewest number of households in the higher income brackets, and the highest number in the lower income brackets. Elko County's median household income is greater than the state average of $44,581, while both Lincoln and White Pine Counties have median household incomes that are lower than the state average.

Within Elko County, Elko City has a median household income of $48,608. Median household incomes in other cities in Elko County are Carlin ($49,571), Owyhee CDP (Census Designated Place) ($23,214), Wells ($35,870), and West Wendover ($34,116). In White Pine County, Ely

has a median household income of $36,408 and the McGill CDP has a median household income of $32,039. The City of Caliente, in Lincoln County, has a median household income of $25,833 (Bureau of the Census 2000g).

TABLE 3.17-11. DISTRIBUTION OF HOUSEHOLD INCOME, 1999

DESCRIPTION	STATE OF NEVADA	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
Households	751,977	15,689	1,556	3,285
Less than $10,000	7.2%	6.7%	17.6%	12.2%
$10,000 - $14,999	5.2%	5.0%	7.7%	6.0%
$15,000 - $24,999	12.3%	10.3%	16.1%	14.6%
$25,000 - $34,999	13.1%	12.6%	10.1%	13.5%
$35,000 - $49,999	18.1%	17.4%	15.1%	18.3%
$50,000 - $74,999	21.7%	27.7%	22.4%	22.9%
Greater than $75,000	22.4%	20.3%	11.0%	12.5%
Median Household Income	$44,581	$48,383	$31,979	$36,688

Source: U.S. Bureau of the Census (2000g). 2000 Decennial Census.

Since 1999, the median household income in White Pine County has increased from $36,688 to an estimated $39,420 in 2004, an increase of 7.4 percent (**Table 3.17-12**). In Elko County, the median household income increased by 7.9 percent to $52,202, and median household income in Lincoln County rose by 19.5 percent to $38,226 (Bureau of the Census 2007b).

TABLE 3.17-12. MEDIAN HOUSEHOLD INCOME ESTIMATES, 2000-2004

YEAR	STATE OF NEVADA	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
2004	$47,231	$52,202	$38,226	$39,420
2003	45,249	49,762	36,160	36,765
2002	44,560	49,821	34,758	36,793
2001	44,325	50,533	33,387	36,651
2000	44,698	50,989	34,456	37,038

Source: U.S. Bureau of the Census (2007b). Small Area Income & Poverty Estimates.

Personal income in the three-county area is concentrated in Elko County, with 77.8 percent of the personal income (**Table 3.17-13**). This is in-line with the population distribution between the three counties, with Elko County containing 77.2 percent of the population. Of the three counties, Lincoln County has the most persons in the lower income brackets, with 25.3 percent of households having an income of less than $15,000 per year in 2005.

Elko County has the most diversified sources of personal income of the three counties. Dividends, interest and rents account for 16 percent of percentage of personal income in the county followed by government (14.2 percent), accommodation and food services (11.4 percent) and transfer payments (9.3 percent).

Lincoln County's sources of personal income are more concentrated, indicating a less diversified economy. In Lincoln County, the top four sources of personal income account for 80.2 percent of total personal income in the county. Government accounts for 28.9 percent of all personal income in the county, followed by transfer payments (24.9 percent), dividends, interest and rent (19.9 percent) and proprietors' income (6.5 percent).

In White Pine County, the top four sources of personal income account for 68.0 percent of total personal income in the County. The largest source of personal income in White Pine County is

government, responsible for 28.8 percent of total personal income, followed by transfer payments (15.3 percent); mining (14.9 percent); and dividends, interest, and rent (13.5 percent).

TABLE 3.17-13. PERSONAL INCOME BY SOURCE ($1,000), 2005

INDUSTRY	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
Total Personal Income	1,373,054	100,053	291,403
Dividends, interest and rent	219,066	19,903	39,324
Transfer Payments	128,083	24,882	44,588
Proprietors income	38,804	6,502	12,726
Farm Earnings	13,400	1,959	4,435
Forestry, fishing, and other	D	D	D
Mining	126,849	D	43,411
Utilities	9,493	D	D
Construction	100,412	D	6,951
Manufacturing	7,363	D	1,315
Wholesale Trade	43,655	D	2,316
Retail Trade	64,466	4,094	9,489
Transportation and Warehousing	35,040	2,643	D
Information	7,902	D	1,120
Finance and Insurance	25,573	D	3,225
Real Estate and Rental and Leasing	D	D	1,198
Professional and Technical Services	22,297	D	D
Management of Companies and Enterprises	3,175	0	D
Administrative and Waste Services	17,757	D	2,007
Educational Services	810	L	D
Health Care and Social Assistance	50,518	578	D
Arts, Entertainment, and Recreation	10,530	D	2,211
Accommodation and Food Services	156,715	D	8,838
Other Service, Except Public Administration	24,399	D	3,091
Government	194,925	28,937	83,927

D: Data suppressed to avoid revealing individual company data. L: Less than $50,000, but the estimates for this item are included in the totals.
Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (2007a), www.bea.gov/regional/.

3.17.3.4 Land Ownership

The three counties are contiguous, with White Pine County located north of Lincoln County and south of Elko County. Elko County is bordered on the north by the State of Idaho and the State of Utah on the east. On the west and southwest, Elko County is bordered by the Nevada counties of Humboldt, Lander and Eureka Counties. White Pine County is bordered on the east by the State of Utah and by Eureka and Nye Counties on the west and southwest. Lincoln County is bordered on the east by the states of Utah and Arizona, on the west by Nye County, and on the south by Clark County. The federal government is a significant landowner in each of the three counties (**Table 3.17-14**). Federal entities administer more than 90 percent of the land in both Lincoln and White Pine Counties.

Elko County has the highest percentage of privately-owned land of the three counties as a result of lands transferred to the Central Pacific Railroad during construction of the transcontinental railroad during the 1870s. White Pine County, the proposed site of the EEC, contains 24.2 percent of the area of the three counties and 93.5 percent of the land in White Pine County is controlled by the federal government.

Also see **Section 3.12,** for additional descriptions of land use in the project area.

TABLE 3.17-14. LAND OWNERSHIP

DESCRIPTION	ELKO COUNTY, NV	LINCOLN COUNTY, NV	WHITE PINE COUNTY, NV
Acres	10,995,840	6,816,000	5,699,200
Federal	71.5%	98.29%	93.53%
Indian Reservation	1.5%	0.0%	1.24%
State Government	0.24%	0.28%	0.16%
Local Government and Private	26.76%	1.43%	5.07%

Source: Harris et al. (2001)

3.17.3.5 Agriculture

The area is known for its ranching heritage and ranching influences lifestyles in the three-county region. White Pine County is the most significant of the three counties in agricultural production, producing over $76 million worth of agricultural products in 2002 (**Table 3.17-15**). The majority of agricultural production in both Elko and White Pine Counties is from cattle. In Elko County, cattle account for 91 percent of agricultural production value, while, in White Pine County, cattle are responsible for 92 percent. In Lincoln County, hay is the major commodity. Hay is responsible for 62 percent of production value in Lincoln County, followed by cattle with 38 percent (National Agricultural Statistics Service 2002a, 2002b, 2002c).

TABLE 3.17-15. VALUE OF AGRICULTURAL PRODUCTION, 2002

DESCRIPTION	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
Value of Production ($1,000)	45,311	11,451	76,025
Crops	1,680	7,096	3,938
Livestock	43,631	4,355	72,087

Source: National Agricultural Statistics Service (2002e). 2002 Census of Agriculture.

Elko County has the largest farms in the three-county area, although those with the highest income are in Lincoln County (**Table 3.17-16**). The average farm in Lincoln County had cash income of $35,528 in 2002. By comparison, the average farm in Elko County reported average cash income of $19,900 during 2002. Collectively, the three counties contained 627 farms in 2002 (defined as those with sales of agricultural products of $1,000 or more during 2002). The average value of production was $212,000, although 50.5 percent of the farms had sales of less than $10,000. More than a third (36.7 percent) of those engaged in farming had a principal occupation other than farming while 56.3 percent worked at least one day off the farm and 36.2 percent worked more than 200 days off the farm (National Agricultural Statistics Service 2002d, 2002e). While ranching plays a large role in the identity and lifestyle of the area, outside employment off the farm is usually necessary to augment farm income.

TABLE 3.17-16. AGRICULTURAL ECONOMICS, 2002

	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
Number of Farms	397	109	121
Average Size (acres)	6,227	D	1,679
Average Cash Income	$19,900	$36,528	D
Sales less than $10,000	52.6%	51.4%	43.0%
Operators Principal Occupation is other than Farming (%)	33.7%	38.5%	44.6%
% of Operators Who Work off the Farm	54.4%	60.6%	58.7%
% of Operators Who Work more than 200 days off the Farm	35.0%	36.7%	39.7%

Source: National Agricultural Statistics Service (2002a, 2002b, 2002c, and 2002d). 2002 Census of Agriculture.
D: not disclosed.

3.17.3.6 Housing

Elko County has the highest housing occupancy rate of the three counties, followed by White Pine County and Lincoln County (**Table 3.17-17**). In both White Pine County and Lincoln County, a significant percentage of the housing units are for seasonal, recreational, or occasional use.

TABLE 3.17-17. HOUSING OCCUPANCY, 2000

DESCRIPTION	STATE OF NEVADA	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
Housing Units	827,457	18,456	2,178	4,439
Occupied	90.8%	84.7%	70.7%	73.9%
Vacant	9.2%	15.3%	29.3%	26.1%
For Seasonal, Recreational, or Occasional Use	2.0%	3.9%	14.0%	17.3%

Source: Bureau of the Census (2000h).

The median age of available housing is highest in White Pine County (**Table 3.17-18**). Housing in White Pine County tends to be about 10 to 20 years older than the other two counties. The value of owner occupied housing is highest in Elko County followed by Lincoln and White Pine counties (Bureau of the Census 2000i). White Pine County has an unusually high number of residents living in institutional settings due to the Ely State Prison and Ely Conservation Camp inmate populations (White Pine County 2006).

TABLE 3.17-18. AGE AND VALUE OF HOUSING, 2000

DESCRIPTION	STATE OF NEVADA	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
Median Year Built	1986	1984	1974	1962
Median Value ($), Owner Occupied	132,500	106,200	74,300	65,600

Source: U.S. Bureau of the Census (2007c).

White Pine County has the highest rate of owner-occupied housing units in the three counties, followed by Lincoln and Elko Counties (**Table 3.17-19**). The high percentage of owner occupied housing may be due to company housing provided by Kennecott. The company housing was sold to residents in the 1950's and represents the majority of the County's older housing stock.

TABLE 3.17-19. OCCUPIED HOUSING, 2000

DESCRIPTION	STATE OF NEVADA	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
Occupied Housing Units	751,165	15,368	1,450	3,282
Owner Occupied	60.9%	69.8%	74.7%	76.5%
Renter Occupied	39.1%	30.2%	25.3%	23.5%

Source: U.S. Bureau of the Census (2000j).

Elko County has the highest percentage of multi-unit housing: 16.1 percent as compared to 8.7 percent for White Pine County (**Table 3.17-20**). Elko County has the highest incidence of mobile homes, which are common to rural and agricultural areas. The percentage of housing structure that are mobile homes is greater than the state average in each of the subject counties.

TABLE 3.17-20. HOUSING UNITS IN STRUCTURE , 2000

DESCRIPTION	STATE OF NEVADA	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
Housing Units	827,457	18,456	2,178	4,439
1 Unit	57.7%	52.1%	62.7%	72.5%
2-4 Units	8.8%	9.4%	7.1%	5.2%
5-9 Units	8.0%	4.0%	0.0%	1.3%
+10 Units	15.4%	2.7%	1.9%	2.1%
Mobile Home/Other	10.1%	31.8%	28.3%	18.8%

Source: U.S. Bureau of the Census (2000k).

The White Pine County Assessor showed 4,381 housing units in the county as of July, 2006. Of these, 2,177 were in Ely, 609 in McGill, 212 in Ruth, 85 in Lund, with the remainder scattered throughout the rest of the county (White Pine County 2006).

There are two USDA Rural Development public multi-family housing projects in Ely, and one sponsored by the Nevada Housing Division. A third USDA project, the Bristlecone Apartments, has been purchased by the Rural Nevada Development Corporation and is being managed as low-income housing.

Housing costs are currently rising in White Pine County. In 2005, the White Pine County Assessor reported that the median price of a house in Ely was $152,500, $55,000 in Ruth, $72,800 in McGill, and in the area surrounding Ely, $189,000 (White Pine County 2006).

The 2000 Decennial Census indicated that the median year-of-construction for housing in White Pine County was 1962. Many of the older homes contain lead paint. Other housing concerns in the county include lack of affordable single family homes, deterioration of manufactured and mobile homes, and lack of special needs housing such as that for senior citizens and persons with disabilities (Crispin and Isaacson 2008).

3.17.3.7 Community Services

Social services in White Pine County are provided by a variety of government agencies and private groups. The County Social Services Department and Salvation Army provide emergency financial assistance in the form of emergency food and shelter, transportation, rent deposit assistance, and medical and burial assistance. The Food Stamps and Welfare Division of the Nevada Department of Human Resources provides food stamps. Nutritional education and assistance in purchasing food for low-income families is provided through the Women and Infant Children Supplemental Foods Program. Victims of domestic abuse can receive support and assistance through Support, Inc., a private non-profit organization. The White Pine Nutrition Programs in Ely and McGill provide meals, transportation, and recreation to senior citizens in

the county. Adults with developmental disabilities in the county are served by the White Pine Rehabilitation and Training Center (Crispin and Isaacson 2008).

There is a need in White Pine County for increased child care at night and on weekends, primarily to serve family members employed at the local state prison who work rotating shifts. There is also a need for increased services for low-income elderly persons (White Pine County 2006).

Education

School districts in Nevada are defined along county lines. The area of interest is served by three public school districts—one for each of the three counties. Enrollments in the three districts have declined slightly over the past several years (**Table 3.17-21**).

TABLE 3.17-21. ENROLLMENTS IN THE THREE-COUNTY AREA SCHOOL DISTRICTS, 2000-2007

SCHOOL YEAR	ELKO COUNTY SCHOOL DISTRICT	LINCOLN COUNTY SCHOOL DISTRICT	WHITE PINE COUNTY SCHOOL DISTRICT
2006-2007	9,907	982	1,420
2005-2006	9,739	992	1,504
2004-2005	9,739	1,006	1,446
2003-2004	9,582	1,012	1,380
2002-2003	9,694	992	1,435
2001-2002	9,847	1,014	1,464
2000-2001	10,100	1,018	1,554

Source: Nevada Department of Education (2007).

The Elko County School District operates 26 schools with enrollments ranging from 4 to 1,352 students (**Table 3.17-22**). The smallest school in the district is Montello School, which has four students. The largest is Elko High School with 1,352 students in the ninth through twelfth grades (Nevada Department of Education 2007).

TABLE 3.17-22. PUBLIC SCHOOLS IN ELKO COUNTY SCHOOL DISTRICT, 2006-2007

SCHOOL	ENROLLMENT	SCHOOL	ENROLLMENT
Independence Valley	5	Spring Creek	647
Jackpot Combined	146	Sage	548
Montello	4	Petan Ranch	11
Mound Valley	13	Elko Junior High	645
Ruby Valley	21	Spring Creek Middle	681
Grammar School #2	450	Carlin High	236
Northside	561	Wells High	181
Southside	645	Elko High	1,352
Carlin	242	Owyhee High	151
Owyhee	105	Jackpot High	125
Wells	176	Spring Creek High	958
West Wendover	687	West Wendover High	450
Mountain View	808	Elko Early Childhood	59

Source: Nevada Department of Education (2007).

The Lincoln County School District operates nine schools with an enrollment of 982 students (**Table 3.17-23**). The smallest school is Pahranagat Valley Middle School with 54 students. The largest is Lincoln County Senior High School, which accommodates 186 students.

TABLE 3.17-23. PUBLIC SCHOOLS IN LINCOLN COUNTY SCHOOL DISTRICT, 2006-2007

SCHOOL	ENROLLMENT	SCHOOL	ENROLLMENT
Pahranagat Valley	115	Pahranagat Valley Middle	54
Caliente	131	Lincoln County Senior High	186
Panaca	110	Pahranagat Valley High	82
Pioche	85	C.O. Bastian High	145
Meadow Valley Middle	74		

Source: Nevada Department of Education (2007).

The White Pine County School District operates eight schools with a total enrollment of 1,420 students for the 2006-2007 school year (**Table 3.17-24**). The schools range in size from Steptoe Valley High with 13 students to David E. Norman Elementary with 417.

TABLE 3.17-24. PUBLIC SCHOOLS IN WHITE PINE COUNTY SCHOOL DISTRICT, 2006-2007

SCHOOL	ENROLLMENT	SCHOOL	ENROLLMENT
Lund Elementary	48	White Pine Middle	323
Baker Elementary	21	White Pine High	402
David E. Norman	417	Lund High	61
McGill Elementary	135	Steptoe Valley High	13

Source: Nevada Department of Education (2007).

School buildings are in constant need of maintenance and renovation within the White Pine School District. Many of the district's facilities are over 50 years old. The David E. Norman Elementary School was constructed in 1909, the White Pine Middle School in 1912, and McGill Elementary in 1962. All three facilities have problems associated with ADA (Americans with Disabilities Act) compliance, asbestos, and lead-based paint, and are in need of repairs and renovations to meet safety standards (White Pine County 2006).

In addition to public schools, Elko is the site of Great Basin College. The college is a fully accredited four year institution with approximately 3,000 students. The college offers degrees ranging from one-year certificates to Bachelor degrees. Great Basin College also offers classes at several other sites; the largest site beyond the main campus in Elko is Ely, where approximately 230 students attend classes. The college also operates satellite centers in Carlin, Jackpot, Owyhee, Wells, and Wendover. The Community College of Southern Nevada, headquartered in Las Vegas, operates a satellite center in Caliente in Lincoln County.

Law Enforcement

The Nevada Highway Patrol provides law enforcement on the interstate highways and state highways. The Nevada Highway Patrol has substations in Ely, Elko, Jackpot, Wells, and Wendover.

County sheriffs are responsible for the unincorporated portions of the counties, and contract with some of the municipalities for law enforcement services. The White Pine County Sheriff's Department is staffed with an elected sheriff, 15 patrol officers, 5 dispatchers, 5 jailers and part-time deputies in Baker and Lund. Under a cooperative agreement between White Pine County and the City of Ely, the County Sheriff also serves as the Ely Police Chief, and the county sheriff's office provides law enforcement for Ely. The White Pine County sheriff's department also has responsibility for the jail, civil processes, and county-wide emergency communications, and shares ambulance service with the Emergency Management Services office. The county jail has a capacity for 32 male and 8 female inmates. During 2005, the average inmate population

was 17.4. The Ely Shoshone Tribal Council provides law enforcement and judicial services on tribal lands (White Pine County 2006).

The three-county area has a "serious crime" rate that is lower than the state and national averages. Serious crimes are defined as murder and negligent manslaughter, forcible rape, robbery, aggravated assault, burglary, larceny-theft, and motor vehicle theft. These crimes were selected as an index because of their severity, frequency of occurrence, and likelihood of being reported to the police. In 2002, the three counties, individually, had serious crime rates of 2,440, 1,038, and 1,923 per 100,000 persons for Elko, Lincoln, and White Pine Counties, respectively. The comparable rate for the State of Nevada was 4,903 serious crimes per 100,000 persons. The nationwide rate was 4,063 serious crimes per 100,000 persons (Crispin and Isaacson 2008).

Fire Protection

Fire protection in the three counties is provided by various municipal fire departments. The Ely Fire Department has five full-time fire fighters and 28 volunteers. There are volunteer fire departments in McGill, Ruth, Lund, Baker, Cherry Creek, Cross Timbers, and Cold Creek (White Pine County 2006).

The Elko Fire Department has 15 career fire fighters and 32 volunteer fire fighters. In addition, land managing agencies, primarily the USFS and BLM, provide fire fighting units for fighting wildland fires.

Health Care Services

There are three hospitals in the area, one in each county. The William Bee Ririe Hospital in Ely is operated by White Pine County and has 40 beds. Northeastern Nevada Regional Hospital in Elko was constructed in 2001 and has 50 beds. The Grover C. Dils Medical Center, operated by Lincoln County, is located in Caliente and has 20 beds. In addition to the three hospitals, the Public Health Service Indian Health Service operates the Owyhee Community Health Facility in Owyhee in northern Elko County. This facility has six beds and provides general and surgical medical care (Directory of America's Hospitals 2007; White Pine County 2006).

Six physicians practice in White Pine County: three general practitioners, one general surgeon, and two family practitioners supplemented by visiting specialists. There are also two dentists and one optometrist practicing in White Pine County. Nevada Home Health, a private non-profit corporation, provides in-home nursing care, and the area is served by one public health nurse. The White Pine Care Center is a 98-bed skilled nursing facility (White Pine County 2006).

The Ely Mental Health Center provides individual and family counseling, psychiatric evaluation, family and group therapy, and substance abuse counseling. Emergency services are available 24 hours a day. The facility serves White Pine, Lincoln, and Eureka Counties, and is part of the state's rural clinic program. Staff for the center consists of two counselors, four support personnel, and nursing staff every other week, and monthly visits by a psychiatrist (White Pine County 2006).

Emergency medical services in White Pine County are provided by volunteer Emergency Medical Technicians. Dispatching is handled by the county sheriff's office (White Pine County 2006).

Water Supply

The majority of the public water supply systems in the three-county area rely on ground water supplied by wells (**Table 3.17-25**). Only the Jarbidge water system in northern Elko County relies primarily on surface water.

TABLE 3.17-25. COMMUNITY WATER SYSTEMS IN THE THREE-COUNTY AREA

WATER SYSTEM NAME	PRINCIPAL COUNTY SERVED	POPULATION SERVED	PRIMARY WATER SOURCE TYPE
City of Elko	Elko	18,000	Groundwater
Spring Creek Utilities	Elko	6,792	Groundwater
Ely Municipal Water Department	White Pine	5,400	Groundwater
Carlin Utilities	Elko	4,900	Groundwater
West Wendover Water System	Elko	4,200	Groundwater
Spring Creek MHP	Elko	4,146	Groundwater
Caliente Public Utilities	Lincoln	1,500	Groundwater
Wells Municipal Water Department	Elko	1,346	Groundwater
Jackpot Water System	Elko	1,240	Groundwater
McGill Water and Sewer District	White Pine	1,200	Groundwater
Ely Maximum Security Prison	White Pine	1,030	Groundwater
Alamo Water and Sewer GID	Lincoln	800	Groundwater
Panaca Farmstead Water Association	Lincoln	800	Groundwater
Pioche Public Utilities	Lincoln	781	Groundwater
Ruth Water District	White Pine	700	Groundwater
Montello Water System	Elko	287	Groundwater
Valley View RV Park	Elko	2[illegible]0	Groundwater
Jarbidge Water System	Elko	200	Surface Water
Lamoille Water Users Association	Elko	200	Groundwater
Nevada Youth Training Center	Elko	100	Groundwater
Baker Water and Sewer GID	White Pine	85	Groundwater
Tuscarora Water System	Elko	72	Groundwater
Pioche Public Utilities Castleton	Lincoln	60	Groundwater
South Crestview Homeowners	Elko	60	Groundwater
Valley View Trailer Park	White Pine	52	Groundwater
Oasis Int MHP	Elko	46	Groundwater
Cold Creek MHP	White Pine	35	Groundwater
Mountain City Water System	Elko	30	Groundwater

Source: EPA (2007a), Local Drinking Water Information (http://www.epa.gov/safewater/dwinfo.htm)

The Municipal Utilities Board operates the City of Ely water system, which obtains water from two wells and one spring. The city treats the water with chlorine. The city's water rights allow it to take up to 14,476 acre-feet of water per year, or eleven million gallons per day. Total storage capacity is 7.5 million gallons held within six storage tanks. The water system is a mixture of metered and unmetered connections. Metered residential connections are charged $0.75 per 1,000 gallons over 15,000 gallons per month. Unmetered residential connections are charged $19 per month plus $0.23 per 100 square feet of irrigable land. Commercial and industrial connections are charged $14.50 for the first 15,000 gallons used in a month and $0.55 per 100 gallons thereafter. Customers of the Ely Municipal Water Department who are outside of the city limits are charged a 33 percent surcharge (White Pine County 2006).

The City of Ely has been served by a sewer system since 1968. The city estimates that 20 residences inside the city limits continue to use septic systems. The system currently has an average flow of 900 thousand gallons per day and is permitted by the Nevada State Division of Environmental Protection to handle 1.5 million gallons per day. Residents of Ely pay $21 per month for sewer service (White Pine County 2006).

Both McGill and Ruth originally used water systems built by the Consolidated Copper Company in the 1920s. Kennecott sold the water systems to the John W. Galbraith Company in 1962 and the systems were operated by a series of private water companies until the county, operating as a general improvement district, took control of the systems in 1983.

The McGill water system utilizes water supplied from Duck Creek, 8 miles north of McGill. The water is delivered through a 37-inch pipeline that was originally built to deliver water to the smelter at McGill. The Ruth Water System obtains water from springs and is in need of repair. Needed repairs include replacement of the collection system at the springs, and replacement of the system's pipeline. A new well also needs to be drilled. Estimated cost of these repairs and the new well is $7 million (White Pine County 2006).

Solid Waste

White Pine County is served by a regional landfill operated by the Ely Municipal Utilities Board. The landfill is located on the northwestern boundary of Ely. Outlying communities are served by a private waste-collection company that provides pick-up service throughout the county. The landfill is licensed with a Class I permit through the Nevada Division of Environmental Protection and has applied for a Class III permit to accept construction waste. Available capacity in the landfill is being used more rapidly than was initially anticipated.

Additionally, solvents have been detected in the groundwater in the vicinity of the landfill. There is a long-term need to identify and develop an alternative landfill site. Residential landfill rates are $7.50 per month and commercial rates vary with the size and type of business (Crispin and Isaacson 2008).

3.17.3.8 Local Government Finances

Local government finances for the three counties are summarized in **Table 3.17-26**. These data include all local units of governments, including county governments, municipalities, school districts, and special districts. Elko County had the highest general revenue. Lincoln County had the highest per capita taxes while White Pine County had the lowest. Each county spent the largest percentage of its budget on education with police and highways following. White Pine County had the highest outstanding debt per capita of $1,871, followed by Lincoln County at $1,435, and Elko County at $787.

TABLE 3.17-26. LOCAL GOVERNMENT FINANCES, 2002

DESCRIPTION	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
General Revenue (million $)	143.4	22.5	28.9
Intergovernmental Transfers (million $)	86.4	15.6	19.1
Total Taxes (million $)	27.5	4.2	5.2
Per Capita Taxes ($)	617	980	596
Per Capita Property Taxes ($)	397	916	478
Direct General Expenditures (million $)	148.7	19.8	28.2
Per Capita Direct General Expenditures ($)	3,337	4,659	3,242
Education (%)	49.3%	53.0%	49.9%
Health and Hospitals (%)	1.3%	0.7%	0.9%
Police (%)	8.9%	5.8%	10.7%
Public Welfare (%)	0.7%	1.5%	1.0%
Highways (%)	5.9%	10.4%	7.4%
Total Outstanding Debt (million $)	35.1	6.1	16.3
Per Capita Outstanding Debt ($)	787	1,435	1,871

Source: U.S. Bureau of the Census, 2002 Census of Government, as cited in Crispin and Isaacson (2008).

There are two units of local government in White Pine County—the county and the City of Ely. White Pine County and the City of Ely negotiate an annual cooperative agreement to share costs and responsibilities for fire protection, law enforcement, and animal control. Additional governing authority lies with the Ely Shoshone Tribal Government, the White Pine School Board, and general improvement districts. The White Pine School Board, William Bee Ririe Hospital Board, Baker and McGill Ruth Water and Sewer General Improvement Districts, and the White Pine and Baker TV Districts are elected boards that operate independently of city and county governments (White Pine County 2006).

The communities of Ruth, McGill, Lund, Preston, Cherry Creek, and Baker are unincorporated, and have budgets administered through the county government. Each of these communities has a community board that reports to the county commission (White Pine County 2006).

The White Pine County government was nearly insolvent at the end of 2005 and was placed under the supervision of the Nevada Department of Taxation. Insolvency was averted through a combination of tax increases, imposition of a franchise fee, and budget reductions. Although some county personnel were laid-off, no county services or facilities were closed. The county remains under supervision of the state, and will remain so until the financial condition of the county is resolved and policies and procedures are in place to maintain financial health (White Pine County 2006).

Taxable sales in each of the three counties rose from the 2004-2005 fiscal year to the 2005-2006 fiscal year (**Table 3.17-27**). Taxable sales in White Pine County increased by 36.9 percent with taxable sales in Elko County rising 20.1 percent. While a majority of the rise in taxable sales in White Pine County can be attributed to the commencement of Quadra Mining operations in 2004 and the recent rise in commodity prices, only a portion of the increase in taxable sales are due to sales made by companies in the mining industry. The rise in taxable sales in White Pine County is spread evenly across different industries. Of the total $47.2 million increase, $2.5 million came from sales in the mining industry. At the same time, sales by the machinery manufacturing industry rose by $1.5 million and sales by the miscellaneous manufacturing industry rose by $6.4 million (Nevada Department of Taxation 2007).

TABLE 3.17-27. TAXABLE SALES IN THE THREE COUNTIES, FY 2004-2005 AND FY 2005-2006

AREA	FISCAL YEAR, 2004-05	FISCAL YEAR, 2005-06	PERCENT CHANGE
Elko County	$857,707,369	$1,029,762,865	20.1
Lincoln County	30,023,034	31,529,365	5.0
White Pine County	127,928,232	175,147,014	36.9
State of Nevada	43,960,513,477	48,402,487,257	10.1

Source: Nevada Department of Taxation (2006a), Annual Report Fiscal 2005-2006.

In Nevada, there is a minimum 6.5 percent statewide sales tax and various county-option sales taxes. The total sales tax rate in White Pine County is 7.125 percent, while the rate is 6.75 percent in Lincoln County and 6.5 percent in Elko County. The 6.5 percent statewide sales tax is comprised of a 2 percent State Tax, a 2.25 percent Local Schools Support Tax, a 0.50 percent Basic City-County Relief Tax, and a 1.75 percent Supplemental City-County Relief Tax. All of the State Tax is placed in the states' general fund. The other three taxes are distributed between the counties of origin and the state according to established guidelines (Nevada Department of Taxation 2006b).

In addition to the state minimum 6.5 percent sales tax, White Pine County also levies a 0.25 percent Public Swimming Pool Tax, a 0.125 percent Extraordinary Maintenance, Repair or Improvement of School Facilities Tax, and an 0.25 percent Severe Fiscal Emergency Tax. Lincoln County imposes a 0.25 percent Infrastructure Tax. Elko County does not impose any county-option sales taxes above the 6.5 percent statewide sales tax (Nevada Department of Taxation 2006b).

Portions of various excise taxes levied in Nevada are also returned to county governments. These include the Cigarette Tax, the Liquor Tax, Real Property Transfer Tax, and a Motor Vehicle Privilege Tax. The amounts of the various sales and excise taxes returned to the county governments for the 2005-2006 fiscal year are listed in **Table 3.17-28** (Nevada Department of Taxation 2006a).

TABLE 3.17-28. STATE SALES AND EXCISE TAX COLLECTIONS DISTRIBUTED TO THE THREE COUNTIES, FY 2005-2006

TAX	ELKO COUNTY	LINCOLN COUNTY	WHITE PINE COUNTY
Local School Support Tax	$24,148,564	$334,946	$2,267,107
Basic City/County Relief Tax	4,824,328	161,325	763,867
Supplemental City/County Relief Tax	16,830,647	1,257,912	2,816,688
Local Option Sales and Use Tax	NA	75,238	1,060,571
Cigarette Tax	306,363	25,153	59,185
Liquor Tax	58,592	4,811	11,319
Real Property Transfer Tax	321,681	136,863	793,433
Motor Vehicle Privilege Tax	3,222,246	424,439	765,035

Source: Nevada Department of Taxation (2006a), Annual Report Fiscal 2005-2006.

Property taxes are also levied in Nevada at the appropriate rate on the assessed value, which is defined as 35 percent of the taxable value. The taxable value for land is considered the cash value the property would bring in a competitive and open market. For improvements, the taxable value is considered the replacement cost minus depreciation. There is also a tax on the net proceeds of minerals in lieu of property tax on mining and natural resource extraction operations. Mining companies are allowed to deduct from the gross proceeds expenses directly tied to the production of minerals. This tax is levied at property tax rates (Nevada Department of Taxation 2006c).

The total assessed valuation for White Pine County jumped by 73.7 percent from the 2005-2006 fiscal year to the 2006-2007 fiscal year (**Table 3.17-29**). Of the $98 million in assessed value, $70 million was accounted for by an increase in the net proceeds from minerals. The assessed value also increased significantly in Lincoln County. Unlike the increase in White Pine County, the rise in assessed value in Lincoln County was due to a rise in the value of real and personal property, and not to an increase in the net proceeds from minerals (Nevada Department of Taxation 2005, 2006c).

TABLE 3.17-29. TOTAL ASSESSED VALUATION, FY 2005-06 AND FY 2006-07

AREA	FISCAL YEAR, 2005-06	FISCAL YEAR, 2006-07	PERCENT CHANGE
Elko County	$965,348,220	$994,053,541	3.0
Lincoln County	110,322,794	155,710,026	41.1
White Pine County	132,851,808	230,740,743	73.7
State of Nevada	85,776,348,878	114,499,165,678	33.5

Source: Nevada Department of Taxation (2006c), Fiscal Year 2006-2007 Property Tax Rates for Local Governments, Nevada Department of Taxation Fiscal Year 2006a, 2005–2006 Property Tax Rates for Local Governments.

Nevada has a statutory property tax rate cap of $3.64 per $100 of assessed value. In 2005, the State Legislature approved an additional $0.02 per $100 of assessed value. This amount is in addition to the $3.64 per $100 rate cap. Of the additional $0.02, $0.0085 is slated for statewide capital improvements and the remaining $0.015 will go to the conservation of natural resources in Nevada. The average countywide property tax for White Pine County is 3.66 percent for the 2006-2007 fiscal year. The property tax rate for White Pine County is the maximum allowed by Nevada State law. The property tax rates for Elko and Lincoln Counties are 3.004 percent and 3.0766 percent respectively for the 2006-2007 fiscal year.

Property taxes are levied by various government entities and distributed to these various entities upon collection by either the county or state governments. Of a total of $8,445,110 projected to be distributed in White Pine County for the 2006-2007 fiscal year, the largest recipient is the county government (**Table 3.17-30**). In both White Pine and Lincoln Counties, the largest recipient of property tax revenue is the county government. In Elko County and statewide in Nevada, the school districts are the largest recipients (Nevada Department of Taxation 2006c).

TABLE 3.17-30. PROJECTED PROPERTY TAX REVENUE, 2006-2007 FY

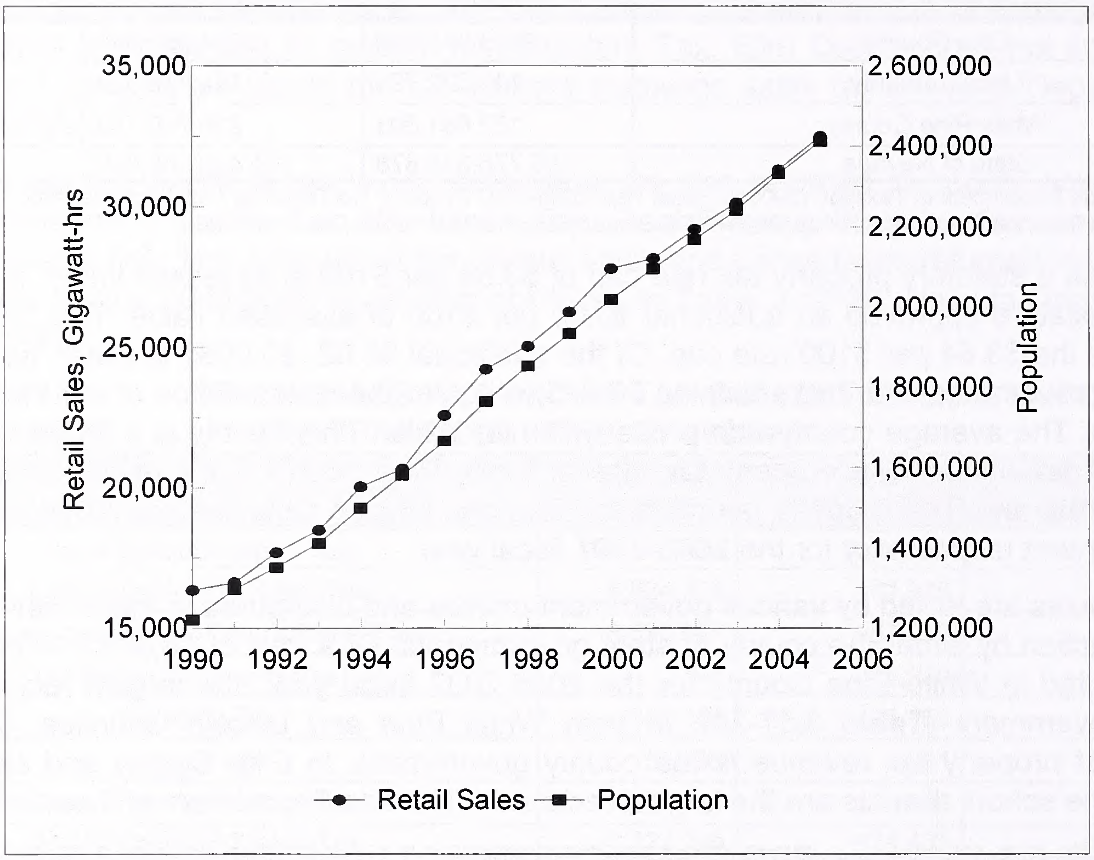
TAX	ELKO COUNTY, NV	LINCOLN COUNTY, NV	WHITE PINE COUNTY, NV	STATE OF NEVADA
Schools	$14,910,803	$1,515,214	$2,424,854	$1,448,580,988
Counties	8,336,133	2,082,622	4,381,997	910,456,361
Cities	4,346,996	94,083	0	446,067,770
Towns	189,184	79,601	0	95,223,982
Combined Special Districts	388,613	754,394	1,246,000	508,388,611
State	1,689,891	264,707	392,259	194,648,581
Total	29,861,620	4,790,621	8,445,110	3,603,366,293

Source: Nevada Department of Taxation Fiscal Year (2006c), 2006-2007 Property Tax Records for Local Governments.

3.17.3.9 Electric Power Industry

Between 1990 and 2005, electric power consumption in Nevada increased from 16,352 GW-hrs to 32,501 GW-hrs, an increase of 98.8 percent. This rise in demand for electric power is consistent with the increase in population of 97.6 percent over the same time period (**Figure 3.17-2**).

Figure 3.17-2. Nevada Electric Energy Consumption and Population, 1990-2006



Population projections by the Nevada State Demographer's Office indicate that by 2025, the Nevada State population will be 4,315,334. Applying this population projection to the linear relationship between electric power consumption and population as demonstrated in **Figure 3.17-2**, projections indicate that in 2025, demand for electric power in Nevada could be 59,285 GW-hrs.

At the end of 2005, there were 19 electric utilities operating in Nevada (**Table 3.17-31**). The two investor-owned utilities—Nevada Power Company and Sierra Pacific Power Company—are both owned by Sierra Pacific Resources, the company proposing the EEC.

TABLE 3.17-31. ELECTRIC UTILITIES OPERATING IN NEVADA

UTILITY	CLASS OF OWNERSHIP	NUMBER OF CONSUMERS	REVENUE ($1,000)	SALES (MEGAWATT-HRS)
Alamo Power District No. 3	Public	649	806	11,330
Boulder City	Public	7,599	7,890	155,243
City of Caliente	Public	753	1,009	10,978
City of Fallon	Public	4,645	7,987	71,906
City of Pioche	Public	560	421	5036
Colorado River Commission of Nevada	Public	7	82,807	1,494,531
Harney Electric Coop, Inc.	Cooperative	1,494	4,257	88,690
Lincoln County Power District No. 1	Public	911	1,621	32,856
Mt. Wheeler Power, Inc.	Cooperative	6,693	24,983	425,317
Nevada Power Company	Investor	757,191	1,802,513	19,804,606
Overton Power District No. 5	Public	11,208	27,231	340,015
Penoyer Valley Electric Coop	Cooperative	62	66	963
Plumas-Sierra Rural Electric Coop.	Cooperative	357	448	4,560
Raft River Rural Elec Coop Inc.	Cooperative	1,828	2,839	56,961
Sierra Pacific Power Company	Investor	302,016	887,247	8,720,571
Surprise Valley Electrification Corp.	Cooperative	5	3	39
Valley Electric Association Inc.	Cooperative	18,438	37,419	392,549
Wells Rural Electric Co	Cooperative	4,918	29,940	681,410
Western Area Power Administration	Federal	6	205	28,253
Total	Various	1,119,340	2,919,692	32,325,814

Source: Energy Information Administration, Electric Sales Revenue and Average Price (2006a).

At the beginning of 2006, there were 43 electric power plants in Nevada with a total of 155 individual generating units (**Table 3.17-32**). These 43 plants were operated by 19 different entities. Total summer generating capacity was 8,619.61 MW.

TABLE 3.17-32. ELECTRIC GENERATING PLANTS IN NEVADA (2006)

OPERATING COMPANY PLANT/COUNTY	GENERATING UNITS	SUMMER GEN. CAP. (MW)	PRIMARY ENERGY SOURCE
Amp Resources (Stillwater) LLC			
Stillwater Facility/Churchill	14	8.5	Geothermal
Black Hills Ops LLC			
Las Vegas Cogen LP/Clark	2	50	Natural Gas
Las Vegas Cogeneration LP II/Clark	6	220	Natural Gas
Caithness Operating Co			
Beowawe Power/Lander	1	12.1	Geothermal
Caithness Dixie Valley/Churchill	1	58	Geothermal
Sun Peak Project/Clark	3	222	Natural Gas
El Dorado Energy LLC			
El Dorado Energy/Clark	3	450	Natural Gas
Empire Energy LLC			
Empire/Washoe	4	3.68	Geothermal
Homestretch Geothermal LLC			
Wabuska/Lyon	3	0.83	Geothermal
Mirant Las Vegas LLC			
Apex Generating Station/Clark	3	494.4	Natural Gas
Naniwa Energy LLC			
Tri Center Naniwa Energy/Storey	6	300	Natural Gas
Nevada Cogeneration Assoc # 1			
Nevada Cogen Assoc#1 GarnetVly/Clark	4	85	Natural Gas
Nevada Cogen Associates 2 Black Mountain/Clark	4	85	Natural Gas

OPERATING COMPANY PLANT/COUNTY	GENERATING UNITS	SUMMER GEN. CAP. (MW)	PRIMARY ENERGY SOURCE
Nevada Power Co			
Clark/Clark	10	700	Natural Gas
Harry Allen/Clark	1	72	Natural Gas
Reid Gardner/Clark	4	555	Coal
Silverhawk/Clark	3	560	Natural Gas
Sunrise/Clark	2	69	Natural Gas
Ormat Nevada Inc			
Brady/Churchill	4	17.5	Geothermal
Desert Peak Power Plant/Lyon	1	9	Geothermal
Richard Burdette Geothermal/Washoe	2	28	Geothermal
Steamboat 1/Washoe	7	2.8	Geothermal
Steamboat 1A Power Plant/Washoe	2	1.8	Geothermal
Steamboat Hills, L.P./Washoe	1	5.8	Geothermal
Reliant Energy Bighorn LLC			
Bighorn Electric Generating Station/Clark	3	570	Natural Gas
Saguaro Power Co			
Saguaro Power/Clark	3	101	Natural Gas
Sierra Pacific Power Co			
Battle Mountain/Lander	4	7.2	Fuel Oil
Brunswick/Carson City	3	6	Fuel Oil
Fleish/Washoe	1	2	Water
Fort Churchill/Lyon	2	226	Natural Gas
Gabbs/Nye	2	5.4	Fuel Oil
North Valmy/Humboldt	2	522	Coal
Tracy/Storey	9	500	Natural Gas
Valley Road/Washoe	3	6	Fuel Oil
Verdi/Washoe	1	2.1	Water
Washoe/Washoe	2	1.5	Water
Winnemucca/Humboldt	1	1.5	Natural Gas
Soda Lake Ltd Partnership			
Soda Lake Geothermal No. I II/Churchill	10	10.9	Geothermal
Southern California Edison Co			
Mohave/Clark (closed Dec. 31, 2005)	2	1,580	Coal
Steamboat Development Corp			
Steamboat II/Washoe	2	13.2	Geothermal
Steamboat III/Washoe	2	13.2	Geothermal
Truckee-Carson Irrigation District			
Lahontan/Churchill	3	1.8	Water
U S Bureau of Reclamation			
Hoover Dam/Clark	9	1,039.4	Water

Source: Energy Information Administration, Existing Generating Units in the United States by State, Company and Plant (2005).

The Mohave Generation Station located in Clark County, ceased operation in 2005. The plant used coal from the Black Mesa Coal Mine, operated by Peabody Western Coal Company, on the Navajo and Hopi Indian Reservations. Southern California Edison, the plant operator, owned 56 percent of the plant; the Salt River Project, 20 percent; Nevada Power, 14 percent; and the Los Angeles Department of Water and Power, 10 percent. On June 19, 2006, Southern California Edison announced abandonment of plans to return the plant to service, and in February, 2007, the Salt River Project announced they were discontinuing separate efforts to restart the plant. Nevada Power Company's share of the plant amounted to 221 MW (Southern California Edison 2007).

The two utilities owned by Sierra Pacific Resources are collectively responsible for 94.6 percent of the electric utility customers in Nevada, 92.1 percent of utility revenue, and 88.2 percent of sales (EIA 2006a).

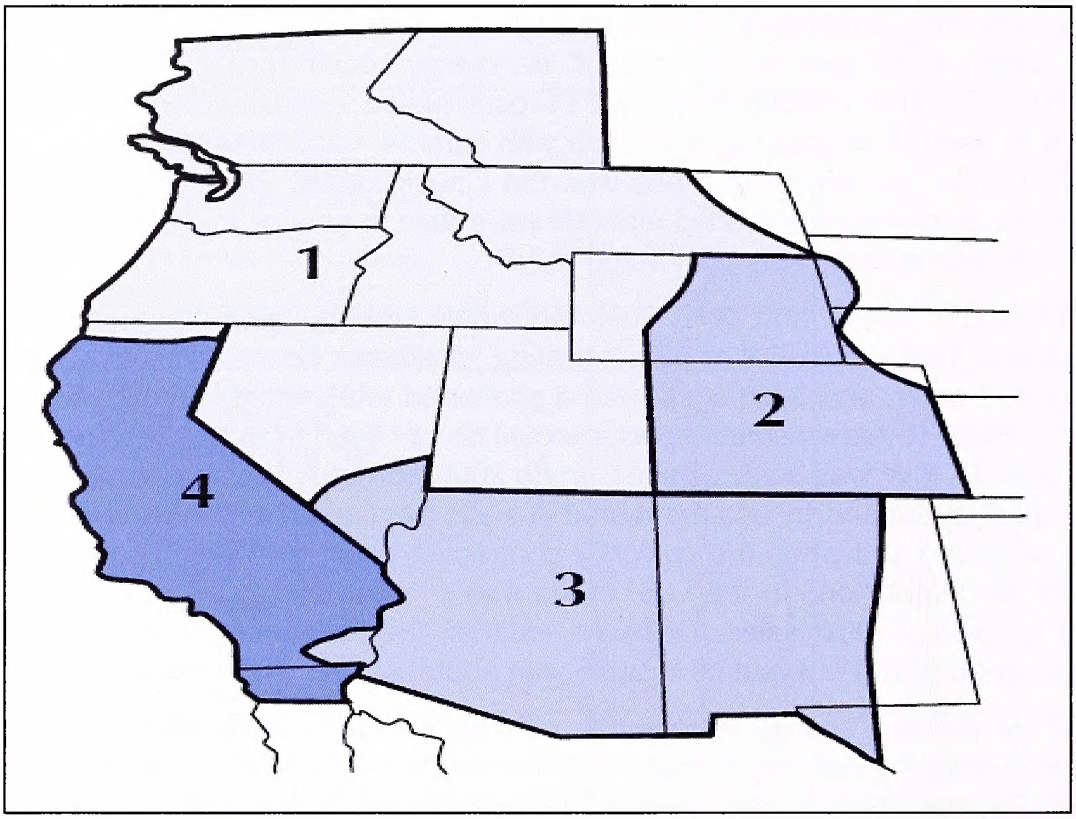
SPPC meets their customers' needs through a combination of internally generated and purchased power. In 2006, SPPC had five fossil-fueled power plants in service with capacities greater than 100 MW and a number of smaller peaking plants (NSOE 2007). The largest of these was the Tracy Plant in Storey County (514 MW). Three privately owned, non-utility generating stations were also in service or under construction in 2006.

NPC also meets their customers' needs through a combination of generated and purchased power. In 2006, NPC met 46 percent of its energy requirements (MWH) through power purchases (NSOE 2007). In 2006, NPC had 11 fossil-fueled, company-owned or shared-interest power plants in service or under construction with summer capacities ranging from 54 to 1,102 MW (NSOE 2007). The largest of these was the Chuck Lenzie Plant in Clark County. Seven privately owned, non-utility generating stations were also in service in the NPC system in 2006 with power from four of them fully contracted to NPC.

As of March 2007, SPPC and NPC had renewable energy generation under contracts or pending approval from the PUCN at 33 generating facilities in Nevada including 20 geothermal, 6 hydroelectric, 4 solar, and 3 biomass, with a combined total nameplate capacity of 433.1 MW (NSOE 2007). Most of this renewable power would be obtained from geothermal resources (329 MW) and about 77 MW was solar. Based on its 2006 portfolio, Nevada ranked number one in the U.S. for geothermal energy use measured in watts per capita, and second in percent of kWh sales. It is expected that when the currently contracted solar resources come on line they will rank Nevada as number one in the U.S. in the use of solar energy as measured in watts per person and percent of retail sales (kWh). In addition, the Proponents had added 7 customer-scale, utility-owned solar PV systems in 2006 with a total capacity of 0.3 MW.

The market for electric energy is regional with eight electric reliability councils across the country coordinating the delivery system. In the western United States, the Western Electricity Coordinating Council (WECC) coordinates the system in all, or part of, 14 states; the Canadian provinces of Alberta and British Columbia; and a portion of northern Baja California (**Figure 3.17-3**). Within the WECC, southern Nevada, which is primarily served by Nevada Power Company, is included in the Arizona/New Mexico/Southern Nevada Power Area (AZ/NM/SNV); and the remainder of Nevada, which is primarily served by Sierra Pacific Power Company, is in the Northwest Power Pool Area (NWPP). The Rocky Mountain Power Area (RMPA) and the California/Mexico Power Area (CA/MX) are the remaining reporting areas in the WECC (WECC 2006). These reporting areas are generally defined by the location of generating and transmission facilities and ability to transmit electric energy. Currently, there is no existing transmission connection between the Northwest Power Pool Area and the Arizona/New Mexico/Southern Nevada Power Area. The transmission facilities associated with the EEC would provide transmission connection between these two areas.

Figure 3.17-3. Western Electricity Coordinating Council Reporting Areas (1) Northwest Power Pool Area (2) Rocky Mountain Power Area (3) Arizona/New Mexico/Southern Nevada Power Area (4) California Mexico Power Area Source: Western Electricity Coordinating Council, 2006



Projections by the WECC indicate that summer peak electric energy demand in the WECC service area will increase by 22.8 percent between 2005 and 2015 (**Table 3.17-33**). Peak summer demand in the Arizona/New Mexico/Southern Nevada Power Area is expected to increase by 30.6 percent over the same time period.

TABLE 3.17-33. SUMMER PEAK ELECTRIC ENERGY DEMAND IN WECC REPORTING AREAS (MW)

AREA	2004	2005	2015
Northwest Power Pool Area	51,069	52,698	63,129
Rocky Mountain Power Area	10,400	11,086	14,029
Arizona/New Mexico/Southern Nevada Power Area	25,634	27,974	36,526
California Mexico Power Area	55,920	57,389	70,321
Western Electricity Coordinating Council	141,100	149,147	183,148

Source: Western Electricity Coordinating Council (2006).

3.17.4 Specific Project Area Conditions

3.17.4.1 Plant Sites

The power plant sites are within Steptoe Valley closest to the communities of Ely and McGill, Nevada. Steptoe Valley is bounded on the west by the Egan Range and the Cherry Creek Range, and on the east by the Schell Creek Range. The valley is named after Colonel Edward Steptoe who explored the region in 1854. The northern end of the valley includes the historic community of Currie.

McGill, Nevada had a 2000 population of 1,054 in an area of approximately 1 square mile. McGill is approximately 7 miles south of the proposed South Plant Site in Steptoe Valley. The alternative North Plant Site is about 35 miles north of McGill. Another historic mining town, Cherry Creek, is approximately 8 miles west of the North Plant Site Alternative. Near Cherry Creek, the Overland Stage Line, and subsequent Pony Express and Transcontinental Telegraph, made their way through the mountains of Nevada in the 1860s. While Cherry Creek was, at one time, the largest town in White Pine County, it is now maintained by just a few year-round residents.

The worker village associated with construction of the EEC would accommodate 2,500 people for seven years. The worker village site associated with the South Plant Site is located about 9 miles north of McGill. The Alternative worker village site associated with the North Plant Site Alternative is adjacent to the Lages Station Well Field located about 40 miles north of McGill.

3.17.4.2 Electric Transmission Facilities

The transmission alignments generally pass through public lands or rural areas with dispersed populations. Transmission line Segment 3 passes within about 3 miles to the west of McGill. Transmission line Segment 6C passes within about 10 miles to the west of Ruth. Ruth, Nevada is located about 10 miles northwest of Ely. The town was established in 1903 as a company town for workers in the nearby Robinson copper mining district. It was named for the daughter of the first major copper mine owner, D.C. McDonald. At one time, the town had 2,000 residents. The entire town was moved in 1958 when Kennecott Copper moved in and expanded operations; the original townsite was covered with waste rock. The 2005 population of Ruth was 394.

The existing electric transmission grid into the project area is inadequate to supply power needed for construction of the power plant, worker village, and water supply system. This would be remedied through construction of a new 69kV transmission line by Mt. Wheeler Power, which would improve service locally for both businesses and residences.

3.17.4.3 Water Supply Facilities

The community of McGill is closest in proximity to the South Plant Site, and Cherry Creek is closest to the North Plant Site.

3.17.4.4 Rail Facilities

The Proposed Action includes construction of a rail lead from the selected plant site to the rehabilitated NNRy. In the event that the NNRy line is not available for the EEC, an Alternative Rail Line would be built to connect the plant with the Union Pacific Railroad in Elko County. This Alternative Rail Line would be privately owned by the Proponents. It would roughly parallel the NNRy to the same connection location at Shafter. Both rail routes traverse rural areas and cross US-93 in northern Steptoe Valley and other rural roads.

3.18 Environmental Justice

Environmental justice is the fair treatment of all people so that no one group of people bears a disproportionate share of the negative consequences of industrial or municipal development, or the implementation of federal, state, local or tribal policies or programs. Executive Order 12898, *Environmental Justice*, requires federal agencies to analyze the effects of major actions to determine if their implementation will result in disproportionate effects to minority or low-income populations.

3.18.1 Area of Analysis

The study area for environmental justice includes areas of minority and/or low income populations identified in Clark, Elko, Lincoln, Nye, and White Pine Counties that may be affected by the construction, operation, and maintenance of the EEC.

3.18.2 Data Sources and Methods

The indicators are minority and/or low-income populations in the project area that have the potential to be affected by high, adverse human health or environmental effects during construction or operations phases of the Proposed Action or Action Alternatives. Minority population and income data was taken from the Bureau of the Census 2000 Decennial data noted above in **Section 3.17** and the EPA Environmental Justice Geographic Assessment Tool (EPA 2008). Also reviewed were the White Pine County, Nevada 2006 Comprehensive Economic Strategy, and the White Pine Energy Station Project Draft EIS (BLM 2007e).

3.18.3 Existing Conditions

As noted in **Section 3.17**, the three-county area (Elko, Lincoln, and White Pine counties) is primarily rural, with Elko County containing 77.2 percent of the population of the three counties. White Pine County, site of the EEC, contains 15.0 percent of the 61,032 persons residing within the three-county area. The other associated facilities traverse mainly rural or unpopulated areas.

Table 3.18-1 shows racial and ethnic populations of the five counties and the State of Nevada as a percentage of the overall population in 2000. As per CEQ guidance (CEQ 1997), minority populations of the five counties have been compared to that of the same minority for the larger population (the State of Nevada); where the county minority population is "meaningfully greater" than the parallel state population, it is considered a significant minority population (CEQ 1997, EPA 1998a). As noted in the table by asterisks, the percentage of Native Americans in Elko, Nye, and White Pine counties exceeds the statewide percentage by more than 50 percent (by 400 percent in Elko County). This finding is not unexpected given the several reservations and colonies in those counties.

TABLE 3.18-1. ENVIRONMENTAL JUSTICE STATISTICS FOR AFFECTED COUNTIES (BY RACE AND ETHNICITY)

State/County	Racial/Ethnic Groups, 2000 Census (%)						Population
	White	African American	Asian/ Pacific Islander	Native American/ Alaskan	Other Race	Hispanic or Latino Origin	
Nevada	75.2	6.6	4.5	1.3	7.9	19.7	1,998,257
Clark	71.7	8.9	5.2	0.8	8.6	21.9	1,375,765
Elko	82.2	0.6	0.7	5.3*	8.2	19.7	45,291
Lincoln	92.1	1.8	0.8	0.7	2.5	5.0	4,165
Nye	89.7	1.0	0.7	2.3*	2.5	8.3	32,485
White Pine	86.6	4.6	0.7	3.4*	3.0	19.7	9,181
Nevada x 1.5		9.9	6.75	1.95	11.85	29.55	

Source: EPA (2008). Environmental Justice Geographic Assessment Tool, accessed on line at http://www.epa.gov/Compliance/whereyoulive/ejtool.html on May 28, 2008
*Exceeds the threshold value of 1.5 times the state population percentage for the group, thereby constituting a minority population

Table 3.18-2 shows personal and household income statistics for the five counties and the State of Nevada in 2000. From the table it is evident that a substantially higher percentage of Lincoln County residents fall into the low income brackets. Lincoln County residents are twice

as likely to be in households on public assistance and earning less than $15,000 per year than the state average.

TABLE 3.18-2. ENVIRONMENTAL JUSTICE STATISTICS FOR AFFECTED COMMUNITIES (FOR INCOME GROUPS)

State/County	Population	Persons Below Poverty Level (%)	Households on Public Assistance (%)	Household Income (%)			
				<$15,000	$15,000-$25,000	$25,000-$50,000	$50,000-$75,000
Nevada	1,998,257	10.3	2.3	12.4	12.3	31.2	21.8
Clark	1,375,765	10.6	2.4	12.2	12.4	31.3	21.5
Elko	45,291	8.7	1.8	11.7	10.3	30.1	27.8
Lincoln	4,165	15	5.1	25.6	16.2	25.5	22.7
Nye	32,485	10.6	3.5	18.8	14.6	34.9	17.0
White Pine	9,181	9.4	2.7	18.3	14.6	31.8	22.9

Source: EPA (2008). Environmental Justice Geographic Assessment Tool, accessed on line at http://www.epa.gov/Compliance/whereyoulive/ejtool.html on May 28, 2008

3.18.4 Specific Project Area Conditions

3.18.4.1 Minority Communities

A minority population may be present if the minority population percentage of the affected area is meaningfully greater than the minority population in the general area. According to demographic data provided above in **Section 3.17** and in **Tables 3.18-1** and **3.18-2**, the three subject counties are relatively uniform demographically. White Pine County's population is 86.6 percent white. The second largest racial group is black, making up 4.6 percent of the population. Lincoln County's population is over 90 percent white with the second most commonly cited racial category composed of two or more races.

Elko County's population is 82 percent white with Native Americans accounting for 5.3 percent of the population. Hispanics, who may be of any race, comprise 10.7 percent of the population of White Pine County, 19.7 percent of Elko County's population, and 5.0 percent of Lincoln County's population. In comparison, the State of Nevada in 2000 was about 75.2 percent white, 19.7 percent Hispanic or Latino, 6.6 percent black or African American, and 1.3 percent Native American.

In Ely, Nevada, the demographics are similar to those of White Pine County as a whole, with racial composition listed as 81.8 percent white, 12.3 percent non-Hispanic, 4.1 percent Native American, and 6 percent other races or two or more races.

According to the 2000 census, McGill, Nevada is 94 percent white, 2.8 percent Native American, 6.7 percent Hispanic or Latino, and the rest are other races.

The data demonstrates that there are minority populations in the project area, based on racial factors. The Native American Concerns sections of this EIS (**Section 3.11** and **4.11**) further describe this segment of the minority population in the area.

3.18.4.2 Low Income Communities

Low income families are defined as those families whose incomes do not exceed 150 percent of the poverty level. Poverty is defined by family; either everyone in a family is at poverty level or no one in the family is in poverty. The family characteristics used to determine poverty status include: number of people, number of children in the family under age 18, whether or not the main householder is over age 65, and the household income. Based upon family characteristics,

a household income threshold is determined as the basis for whether or not that family is defined as living at or below the poverty level.

In White Pine County in 2004, there were an estimated 961 individuals at poverty level (12.4 percent); 282 were under age 18. In Elko County in 2004, there were 3,886 (8.7 percent) individuals at poverty level; 1,510 were under age 18. In Lincoln County in 2004, 523 (13 percent) individuals were at poverty level; 188 were under age 18.

The number of low income households surveyed in White Pine County for the White Pine Energy Station Project Draft EIS (BLM 2007e) is 838 (25 percent of the county's households). The number of individuals surveyed who live in low income households in the three census tracts, including Ely and McGill, was 866. Of those 866, 265 lived in either small communities of less than 1,000 people, or in areas where no other residences existed within several miles. Of 241 low-income people surveyed in census tract 9701, 112 live in McGill. There are 489 low-income people in Ely.

As noted above in **Section 3.17**, personal income in the three-county area is concentrated in Elko County, which accounts for 77.8 percent of all personal income within the area. This is in line with the population distribution between the three counties, with Elko County containing 77.2 percent of the population. Of the three counties, Lincoln County has the largest number of persons in the lower income brackets, with 25.3 percent of households having an income of less than $15,000 per year. Lincoln County is also the most rural in nature of the three counties.

See, also, **Section 3.17** above for further details on the socio-economics of the area.

3.18.4.3 Public Participation

An integral part of the public participation process included scoping meetings, mailings, and press releases as described in the Scoping Report (JBR 2007c). See **Chapter 6**, Consultation and Coordination, for a complete description of public involvement efforts.

3.18.4.4 Plant Sites

The North and South Power Plant sites, as well as the Mt. Wheeler Transmission Line are closest to the communities of Ely and McGill, Nevada, which are included in the above discussion.

3.18.4.5 Electric Transmission Facilities

The transmission facilities generally pass through public lands or rural areas with dispersed populations. Since there are up to about 25 percent low income households present in Elko, White Pine, and Lincoln counties, it is likely that some rural, low income households would be located near the proposed transmission facilities.

3.18.4.6 Water Supply Facilities

The Lages Station Well Field and associated pipeline system is within Steptoe Valley. The community of McGill, described above, is closest in proximity to the South Plant Site, and the southern extent of the water pipeline. Cherry Creek, described in **Section 3.17**, is closest to the North Plant Site and Lages Station. While Cherry Creek was once the largest town in White Pine County, it is now maintained by just a few year-round residents.

3.18.4.7 Rail Facilities

The rail leads and rail operations associated with the EEC are also located within the area described above.

3.19 Hazardous and Solid Waste Materials

3.19.1 Area of Analysis

The project area includes the power plant site; two substation sites, a 1,000-foot-wide corridor that extends 500 feet from each side of the proposed centerline for the electric transmission lines; a 600-foot-wide corridor that extends 300 feet from the proposed centerline of other linear features (e.g. water pipelines, rail leads, and access roads); parcels for wells, pump stations, and water storage facilities; and the planned Harry Allen Substation expansion.

3.19.2 Data Sources and Methods

Data for this section were acquired from field observations and two environmental site assessments conducted along the NNRy (URS 2002; CDM 2004).

3.19.3 Existing Conditions

Most of the land uses of the Proposed Action and Action Alternatives have been open range or agricultural with no history of solid or hazardous waste generation or disposal. The main exception to this has been the NNRy, which has been evaluated for the presence of solid and hazardous wastes. There is also evidence of scattered debris being located within the proposed transmission line ROWs.

Public solid waste disposal in Steptoe Valley area is served by the City of Ely Landfill which, as of a 2004 survey, has adequate capacity for 42 years of additional waste disposal. This landfill is located about 1 mile northeast of Ely and is the only public landfill in the county. In addition to the City of Ely Class I landfill, there are two private Class III waiver landfills at the Bald Mountain Mine and the Robinson Nevada Mines.

The solid waste disposal activities in the county are described in the White Pine County Solid Waste Management Plan Revision (WPCC 2006). White Pine County and the City of Ely maintain in inter-local agreement governing charges for the use of the City's landfill to meet the needs of county residents. White Pine County maintains a franchise agreement with a contractor for collecting, hauling and disposing of solid waste from all areas of the county to the White Pine Regional Landfill. The franchise agreement prohibits other parties from providing these same services as a business venture in the county. The franchise agreement does not prohibit solid waste generators from hauling and disposing of their own waste at the landfill.

Beginning in 2003, the City of Ely, Nevada Division of Forestry, BLM, and the USFS collaborated to reduce solid waste disposal in remote areas of the County and direct solid waste from these areas to the Ely landfill. The program has reportedly resulted in fewer illegal dumps occurring on public lands in the area (www.blm.gov/nv).

There is no hazardous waste disposal facility located in the immediate area so these materials that are generated locally and disposed in permitted hazardous waste facilities are trucked by commercial carriers to existing, permitted facilities in Nevada and surrounding states.

3.19.4 Specific Project Area Conditions

3.19.4.1 Plant Sites

The South Plant Site and the North Plant Site Alternative are located on BLM-administered land that is currently undeveloped and used for livestock grazing and wildlife habitat. There are no known occurrences of solid or hazardous materials or wastes on either plant site.

3.19.4.2 Electric Transmission Facilities

The proposed electric transmission lines for the project are generally located on BLM-administered land that is currently undeveloped and used for livestock grazing and wildlife habitat. Portions of the land affected by the proposed transmission lines may cross private property. Although the existence of hazardous materials along these proposed alignments is possible, development within these areas is limited and is not expected to have produced substantial quantities of hazardous materials. There are widely scattered occurrences of solid wastes within the transmission line ROWs and no reports of hazardous materials or wastes.

3.19.4.3 Water Supply Facilities

The proposed water wells and water pipeline facilities and alternatives for the project are generally located on BLM-administered land that is currently undeveloped and used for livestock grazing and wildlife habitat. Portions of the land affected by the proposed water supply facilities and alternatives are located on private property that has been used for agricultural purposes. Although the existence of hazardous materials within these proposed facilities is possible, development within these areas is limited and is not expected to have produced substantial quantities of hazardous materials. There are no known occurrences of solid or hazardous materials or wastes on the sites of the proposed water supply facilities.

3.19.4.4 Rail Facilities

The existing NNRy property was used for decades to transport ore, concentrates, and smelter products from the mines and mineral processing facilities in the Ely area north to the UPRR at Shafter. It was also used to transport general freight into the McGill and Ely areas. Potential hazardous substances that could have been present along the NNRy during operations include: petroleum hydrocarbons (fuel, grease, lubricating oil), coolant, creosote, and metals contained in ore, concentrates, and smelter products. Environmental site assessments have been completed for the NNRy (URS 2002; CDM 2004). These assessments included inspections of the entire NNRy looking for potential environmental liabilities. In general, surface soils and the railroad bed did not appear to present potential environmental concerns as evidenced by any significant hydrocarbon or chemical stains. There are scattered occurrences of solid waste along the ROW, particularly at sidings where buildings previously stood and where cans, glass, trash, wood, tires, metal parts, or other solid wastes may have been left on the ground (URS 2002).

There are also locations along the roadbed where mineral mining and processing materials like slag, brick, and wasterock have been used as construction materials. The most significant amount of these materials is located on the ROW north of Shafter, which will not be involved in the proposed reconstruction of the NNRy (URS 2002). A review of federal and state environmental databases for solid waste landfills, hazardous waste sites, corrective action sites, and petroleum storage tank sites did not identify any such sites along the NNRy ROW. CDM (2004) conducted sampling and analyses of mine and mineral processing wastes scattered along the NNRy ROW and conducted a screening level risk assessment with these data. The results of this risk assessment suggested that possible risks associated with these materials along the NNRy are below those that might trigger a concern for additional assessment or clean-up (CDM 2004). CDM also conducted some clean-up activities along the ROW, removing accessible oil-stained soil, and picking up possible hazardous substances such as batteries, potential asbestos containing material, spray cans and containers of hydrocarbons, antifreeze, and other liquids.

The Alternative Rail Line for the project is generally located on BLM-administered land that is currently undeveloped and used for livestock grazing and wildlife habitat. Although the existence of hazardous materials along this proposed alignment is possible, development within this area is limited and is not expected to have produced substantial quantities of hazardous materials. There are no known occurrences of solid or hazardous materials or wastes on the Alternative Rail Line ROW.

3.20 Transportation

3.20.1 Area of Analysis

This section discusses the existing transportation system within the project area for the EEC. The area of analysis for transportation was determined as the area potentially affected by the EEC Project and is comprised of Elko, White Pine, Nye, Lincoln, and Clark Counties, Nevada. The power plant itself would be located in White Pine County. The railroad serving the facility would be located in Elko and White Pine counties. The transmission corridors associated with the project would be located in White Pine, Nye, Lincoln, and Clark Counties.

3.20.2 Data Sources and Methods

Existing information on transportation routes within the area of analysis was reviewed and a site-specific transportation study was conducted by HDR Engineering, Inc. and Cummins and Bernard, Inc. (HDR et al. 2007) including:

- Existing highways and road infrastructure
- Other types of transportation routes/access (i.e., railroad, air)
- Level of service of existing primary access routes to project area
- Road administration
- Crash data

3.20.3 Existing Conditions

The project area is generally accessed via a system of regional highways, including US-93, US-50, Interstate 80 (I-80), I-15, SR-318, and US-6 (**Figure 3-20.1**). The Federal Highway Administration (FHWA) administers US-93, I-80, I-15, US-50, and US-6. The Nevada Department of Transportation (NDOT) administers SR-318 and maintains all of the primary routes mentioned. I-80 is an east-west interstate highway that traverses across the northern portion of Nevada. I-15 is generally a north-south interstate highway connecting Las Vegas, Nevada and Salt Lake City, Utah. US-93 runs generally north-south between I-80 and I-15. SR-318 is also a north-south highway that connects US-93 with US-6. US-6, US-50, and I-80 generally run east-west, while US-93, I-15, and SR-318 are generally north-south travelways (see **Figure 3.20-1**).

Both public and private lands are connected to the highway system by an extensive network of unpaved roads. Excluding the primary transportation routes, most roads within the project area are not maintained or paved. Non-maintained or unpaved roads may require four-wheel drive access vehicles due to rough terrain, steep grades, drainage crossings, or other obstructions. These roads include county and private roads.

The primary roads would provide general access to the proposed EEC for project construction personnel, construction materials and equipment delivery, and project operation personnel.

There are many cities and towns along this system of highways that could provide personnel, materials, and services. These towns, the highways that link them to the project area, and the approximate distance from the proposed project sites are listed in **Table 3.20-1**.

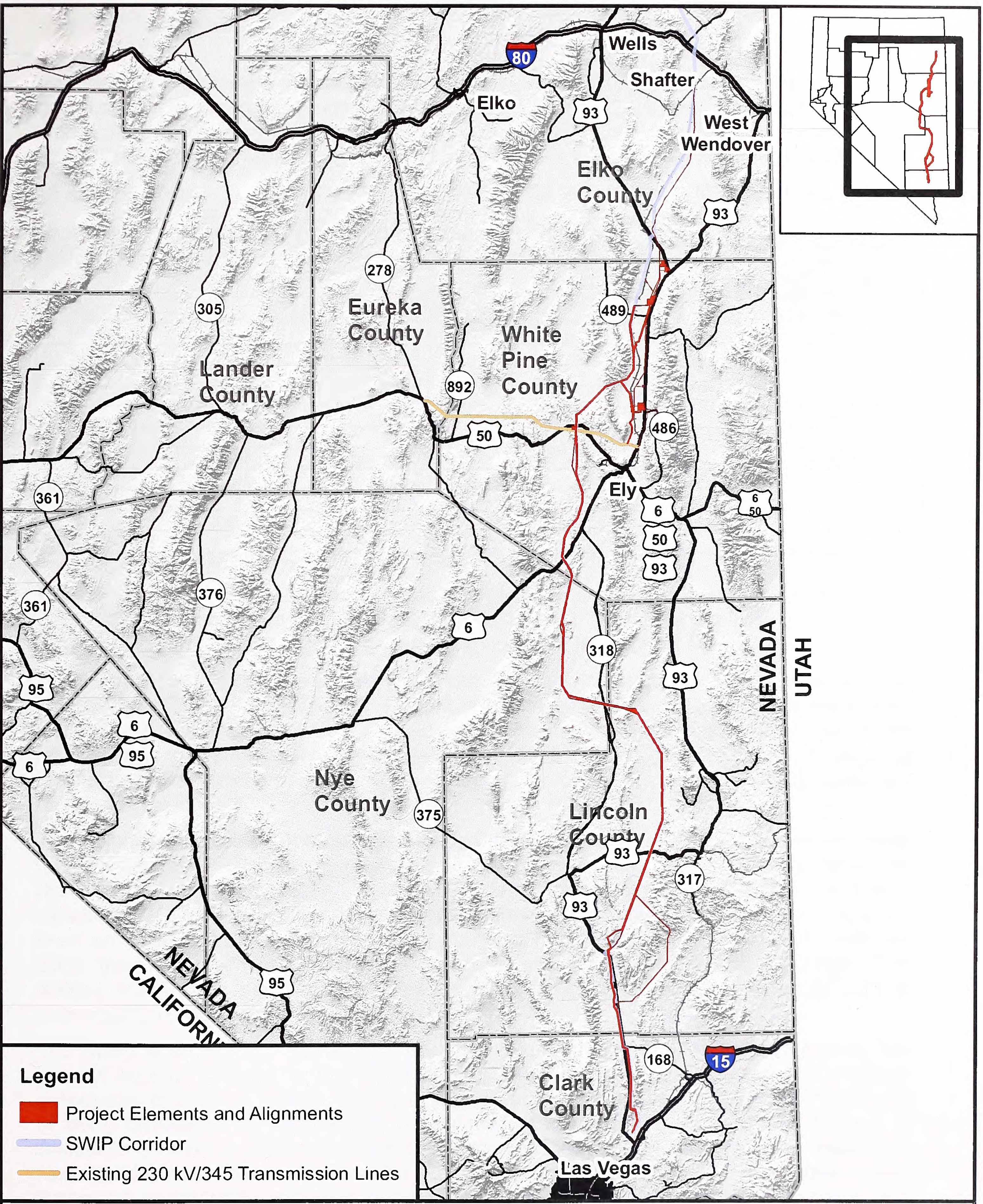
TABLE 3.20-1. POTENTIAL SOURCE TOWNS AND CITIES FOR PROJECT CONSTRUCTION AND OPERATION PERSONNEL AND ASSOCIATED ROADWAYS TO ACCESS THE EEC

TOWN/CITY, STATE	ROADWAY	APPROXIMATE DISTANCE (MILES) TO SOUTH STEPTOE PLANT SITE	APPROXIMATE DISTANCE (MILES) TO ALTERNATIVE NORTH STEPTOE PLANT SITE
Austin, Nevada	US-50 and US-93	165	196
Elko, Nevada	I-80 and US-93	165	138
Ely, Nevada	US-93	19	50
Eureka, Nevada	US-50 and US-93	96	127
Las Vegas, Nevada	I-15 and US-93 or I-15, US-93, SR-318, and US-6	259	293
McGill, Nevada	US-93	7	38
Pioche, Nevada	US-93	128	190
Salt Lake City, Utah	I-80 and US-93	221	190
Wells, Nevada	I-80 and US-93	120	89
Wendover, Utah	I-80 and US-93	101	70
West Wendover, Nevada	I-80 and US-93	101	70

A road's Level of Service (LOS) is a qualitative measure of the operating conditions experienced under varying traffic volumes (HDR et al. 2007). There are six LOS conditions which describe operating traffic conditions from best to worst, A through F, respectively (see **Table 3.20-2**).

TABLE 3.20-2. ROADWAY LEVEL OF SERVICE

LEVEL OF SERVICE (LOS)	DESCRIPTION
A	Free flow, low traffic density or delay
B	Minimum density or delay, stable traffic flow
C	Stable, movements somewhat restricted due to higher volumes, but not objectionable
D	Restricted movements, queues and delay may occur during short peaks, but lower demand occurs often enough to permit clearing, preventing excessive backups
E	Frequent delays, actual capacity is utilized; all movements experience congestion and delay
F	Forced flow, demand volumes exceed capacity resulting in complete congestion



Source - Highways: ESRI
Base Map: University of Nevada, Reno and ESRI

1:2,500,000

10 0 50 Miles

10,000 0 70,000 Meters

Scale is 1:2,500,000 when printed at 8.5" x 11"

N

FIGURE 3.20-1
TRANSPORTATION MAP
ELY ENERGY CENTER

According to the project specific traffic study (HDR et al. 2007), US-93 currently functions at operational LOS A. Traffic counts for various areas along US-93 and other roadways in the project area are taken by NDOT annually and summarized in their Annual Traffic Report (NDOT 2006). **Table 3.20-3** provides traffic counts at four stations in the vicinity of the Plant sites.

TABLE 3.20-3. HISTORIC ANNUAL AVERAGE DAILY TRAFFIC (AADT) VOLUMES NEAR THE SOUTH AND NORTH PLANT SITE LOCATIONS

YEAR	0.5 MILES NORTH OF MCGILL ON US-93	0.4 MILES SOUTH OF MCGILL ON US-93	CHERRY CREEK ROAD 0.2 MILES WEST OF US-93	DUCK CREEK ROAD 200 FEET EAST OF US-93
	AADT	AADT	AADT	AADT
1996	1,345	2,950	50	140
1997	1,435	3,100	80	170
1998	1,445	2,900	45	120
1999	1,530	2,900	60	130
2000	1,485	2,850	50	130
2001	1,495	3,100	50	130
2002	1,558	2,800	50	140
2003	1,535	3,150	50	140
2004	1,562	3,100	50	150
2005	1,600	2,950	60	130
2006	1,700	3,050	60	160

Source: NDOT 2006 Annual Traffic Report

The traffic volumes on US-93 increase south of McGill to about 3,000 vehicles per day due to local traffic between Ely and McGill. Peak hours of use in the area are assumed to be between 7:00 and 9:00 a.m., and 4:00 to 6:00 p.m. during commute times (HDR et al. 2007).

Traffic crash data indicates the highest crash type applicable to the project area involves vehicles that ran off the roadway and struck a fixed object due to vehicle speeds too fast for driving conditions (HDR et al. 2007). Other primary crash types in the area include: animal, ran off roadway and overturned, rear-end collision, and angle collision. The five primary contributing factors to these accidents include: speed too fast for conditions, failure to yield, inattentive driving, animal in roadway, and improper backing (HDR et al. 2007).

The majority of access on BLM lands in the Ely District is informal with reasonable access made for permitted uses such as mining claims, mining uses, mineral leases, grazing, recreation, rights-of-way, and other specific uses (BLM 2008a). Road system management by the BLM is variable with priorities for road maintenance determined on a case-by-case basis. There has been an increase in informal travel route proliferation in the Ely District. Between 1998 and 2003, there has been a 184 percent increase in off-highway vehicle use in Nevada (BLM 2008a). New roads may be constructed on BLM administered land in connection with an authorized project such as a mineral lease or right-of-way.

The NNRy is an existing railroad that runs north-south through Steptoe Valley; however, this railway ceased operation in the 1980s (NNRy Museum 2006). The railway was originally constructed to run from Cobre, Nevada to Ely, Nevada. This railway is currently in the process of being considered for rehabilitation for commercial use from the Union Pacific Railroad at Shafter to Ely through a Joint Development Agreement between the City of Ely, the White Pine Historical Railroad Foundation, and the Proponents (see **Section 2.2.4**). The Union Pacific Railroad runs generally east-west through Nevada with a northern and southern route. The northern route roughly follows I-80 through the state, while the southern route links Salt Lake

City, Utah to Las Vegas, passing through Caliente and Moapa on the way to Las Vegas. Passenger service is available on the northern route, provided by Amtrak.

Access to the area is also available through the Ely Airport (Yelland Field) serviced by Alpine Air for commercial flights and United Parcel Service and Federal Express for freight. The airport is located about 3 miles northeast of Ely. It is owned by White Pine County. Currently there are 28 aircraft based on the field with an average of 28 flights per day (www.AirNav.com). Yelland Field has been operational since 1938 and currently has two asphalt runways. About 69 percent of flights are transient general aviation, 23 percent air taxi, 7 percent local general aviation, and less than 1 percent is military use (www.AirNav.com).

3.20.4 Specific Project Area Conditions

3.20.4.1 Plant Sites

The primary transportation route to both of the plant sites would be US-93, administered by NDOT. This road is classified as an Other Principal Arterial Roadway as shown in the Roadway Functional Classification Map (http://www.nevadadot.com/reports_pubs/Class_Maps). This means that the road serves urban areas over 50,000 in population (i.e., Las Vegas), provides an integrated network of roadways, and/or carries statewide or interstate travel but is not designated as part of the Interstate system. Throughout the project area, this road is generally comprised of two 12-foot travel lanes. The pavement is in good condition and does not show significant signs of rutting, cracking, or raveling along the shoulder (HDR et al. 2007). US-93 interconnects with other primary routes US-50, US-6, I-80, and SR-318. The proposed plant sites are adjacent to the highway and paved access to either site does not currently exist.

South Plant Site

The South Plant Site is located approximately 20 miles north of Ely and 7 miles north of McGill on the west side of US-93 and would be accessed near milepost WP71. The NNRy is located approximately 1.5 miles to the west of the South Plant Site.

The associated worker village is located north of the South Plant site on private land and would be accessed via US-93 and an existing dirt road that provides access to the private Coyote Valley Ranch.

North Plant Site

The North Plant Site is located approximately 48 miles north of Ely and 35 miles north of McGill on the west side of US-93 and would be accessed near milepost WP106. The NNRy is located approximately 4 miles to the west of the North Plant Site.

The associated worker village is located north of the plant site on private land near Lages Station and would be accessed via US-93.

3.20.4.2 Electric Transmission Facilities

The electric transmission facilities traverse generally south from the proposed Plant sites. The primary routes accessing the transmission corridors would include US-93, US-50, US-6, and I-15. Secondary access from the highways would include local improved and unimproved roads.

The proposed Robinson Summit Substation site is accessed via the Jake Wash Road that heads south from US-50. The existing Gonder Switching Station is accessed from US-93 and is immediately adjacent to the highway. The existing Harry Allen Substation is accessed via a dirt road off of US-93, I-15, and SR-604.

3.20.4.3 Water Supply Facilities

Primary access to most water supply alternatives would be via US-93. The Lages Station Well Field and pipeline would be located on the west side of US-93. For the South Plant Site Alternative, the pipeline would cross under Cherry Creek Road (SR-489).

The Middle, South, and Limited South Well Field Alternatives would all be located along the proposed Lages Station Water Pipeline route, located west of US-93. The Coyote Valley Ranch Well Field would also be located on the west side of US-93.

The Duck Creek water pipeline and impoundment area alternative would be accessed via SR-486 (Duck Creek Road) to the east of US-93.

3.20.4.4 Rail Facilities

The NNRy runs from Cobre, Nevada to Ely, Nevada, approximately 140 miles. This railway is currently inactive, as it last operated in 1983 (NNRy Museum 2006), although a small section in Ely is used as part of the railroad museum. The NNRy is located about 1.5 miles to the west of the South Plant Site and about 4.0 miles west of the North Plant Site. If utilized for the project, a rail spur would be constructed from the NNRy to either power plant site in order to deliver coal and other bulk commodities. The railroad is in a state of disrepair and thus would require reconstruction to Federal Railroad Administration standards.

The Alternative Rail Line would be situated between 1 to 5 miles east of the existing NNRy and parallel the existing railroad beginning at Shafter and continuing south to either the South or North Plant Site. The two paved roads it would cross include the northwest trending segment of US-93 above Lages Station and SR-489. The primary transportation routes to either of the railroad corridors include I-80 and US-93.

BLM Mission Statement

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.